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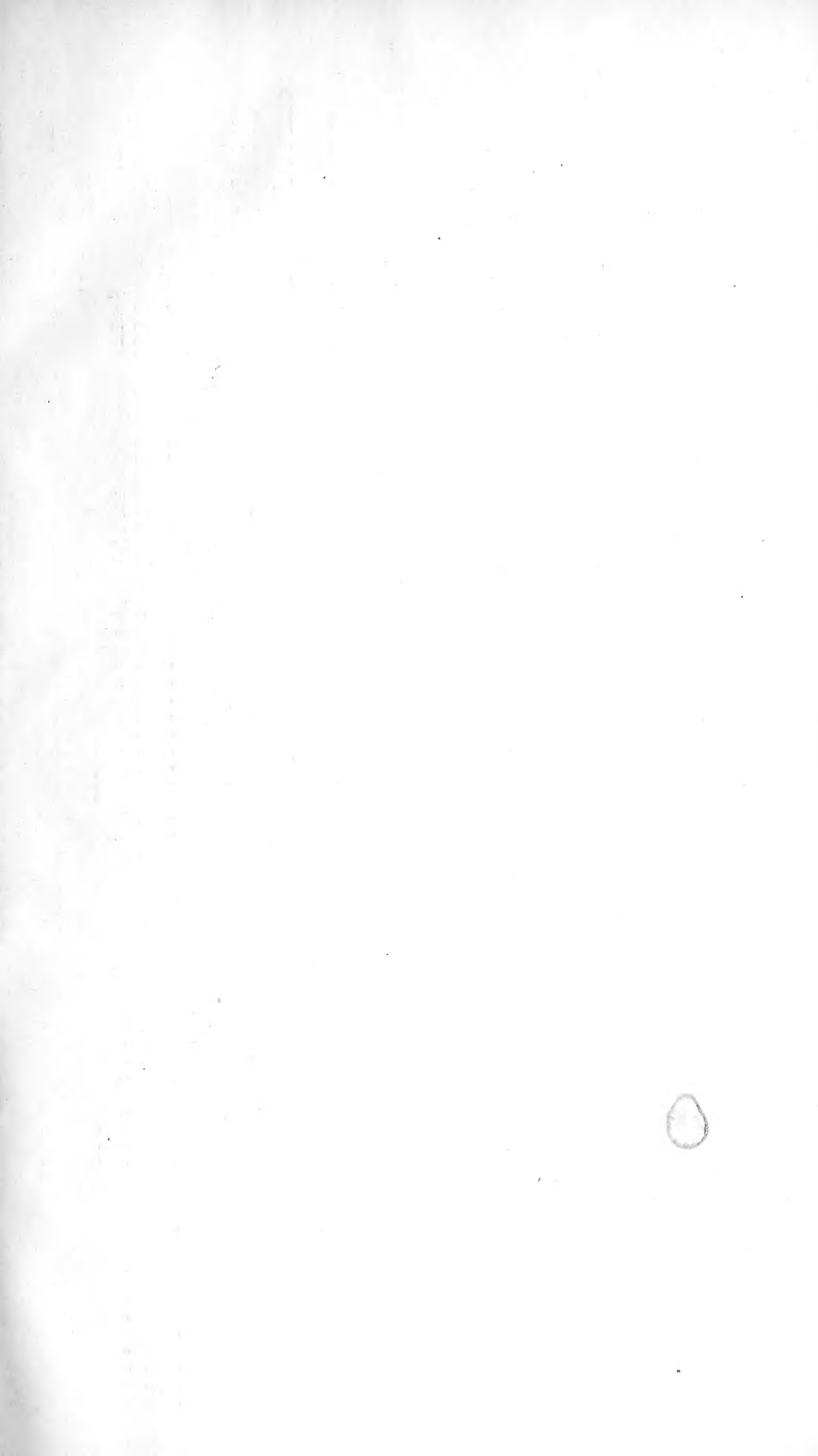
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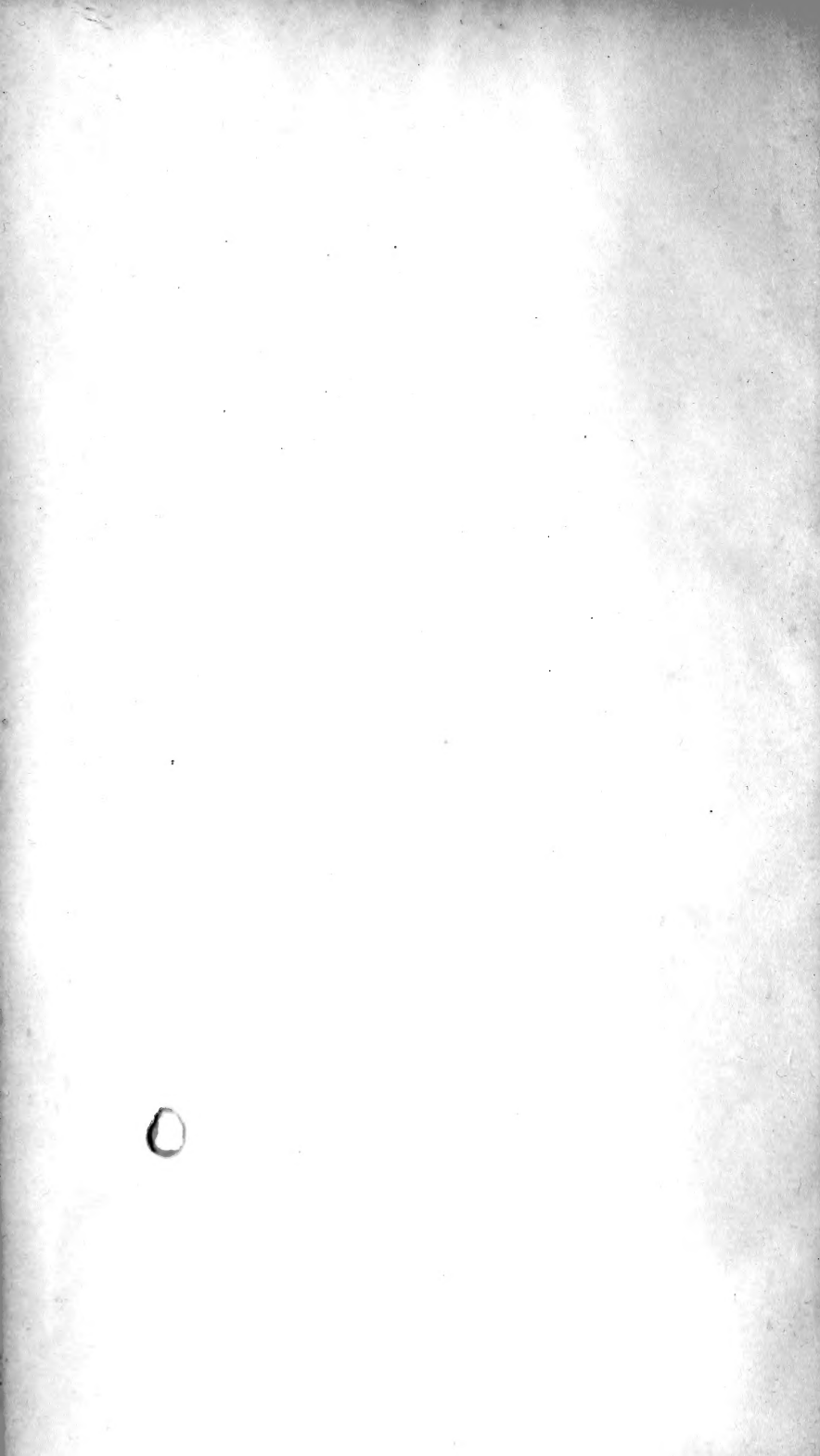
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PUBLISHED BY AUTHORITY OF THE
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EDITED BY
WILLIAM PROCTER, Jr.

Professor of Pharmacy in the Philadelphia College of Pharmacy.

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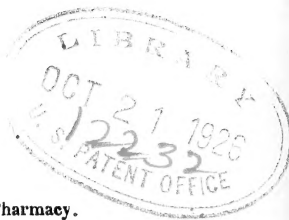
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THE AMERICAN

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RS, 1

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WILLIAM H. HARRIS

PROFESSOR OF PHARMACY
ALFRED L. HARRIS

222 N. 10TH ST. ST. LOUIS

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1891

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JANUARY, 1850.  
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OBSERVATIONS ON THE PRESENT STATE OF PHARMACY IN ENGLAND.

In a previous number, (Vol. XX. page 265) we have given an account of the history of Pharmacy in England, from early time to the year 1820. It is proposed to present in the ensuing pages some statements in reference to the rise and progress the pharmaceutical reformation that has taken place in England during the last ten years. We have been able to do this with great readiness from the pages of the Pharmaceutical Journal, which contain a full record of the proceedings of the reformers.

Perhaps in no other country are the interests of medicine so complicated by time-honored customs. Four classes of practitioners are in cotemporaneous operation, and despite the greater stringency of the law in confining professional bodies within their legitimate spheres, the two that practice pharmacy are constantly intruding upon each other's limits, giving rise to jealousies, suits at law, and other unpleasant evidences of an ill-conditioned system. Of the physicians, properly so called, and the surgeons, we shall have little to say, but the history of the "English apothecaries," or "general practitioners," as they are frequently called, is so intimately connected with that of the chemists and drug-

gists, or true pharmacutists, that they will be frequently alluded to.

There is a force in the Anglo-Saxon character, which, if once brought to bear on any object, will gain its end, or bring about material changes in the condition of the things opposed to it; and the results of its energetic manifestations in favor of pharmaceutical reform have been greatly proportioned to the unanimity of sentiment, and combination of *will*, exhibited by the acting party.

In contemplating the position of the chemists and druggists of England, prior to 1841, we cannot but be struck, with the entire want of any generally understood bond of interest, except that instinctive sense of self-preservation which had from time to time called them together, to oppose, as best they could, the over-weening arrogance and selfishness of the apothecaries in trenching on their rights. They had no general principles of action, the pharmacopœia was their only pharmaceutical authority, except the comments upon it by writers on the *materia medica*; for the rest; each establishment had its own private formulæ, its own methods of manipulation, and the precincts of the laboratory were guarded with a jealous care, proportioned to the slight confidential intercourse that existed amongst the members of the profession.

In England the rights and immunities of professional bodies are based on a stronger law power than with us. The grants of Parliament are readily carried into effect, to the utmost extent when the prosecuting party desires it. Besides, long established usage has given the different branches of the medical corps, "the right of way," as it were, with the public. The physician expects and receives his guinea fee when called in, because it is universally understood in the community that it is the price of his service, and those who send for him prepare for this consequence. This high charge in a society that includes so vast a preponderance of the poorer classes, has led to the immense

increase of the middle class of medical practitioners—the apothecaries. In the earlier state of medicine in England, as in the United States, the practice of pharmacy was conducted chiefly under the supervision of physicians, at their offices, by young men who were students of medicine, or by medical men of inferior capacity, who, from poverty, or because they did not aspire higher, spent their days in this service.

About the close of the sixteenth century, the London physicians gradually repudiated pharmacy, by allowing it to fall into the hands of their assistants as a separate class, and thereafter, *the apothecaries*, as these were called, assumed a more distinct and well defined character. Certain parts of medical practice, which, as office assistants, they had formerly executed, they continued to perform in their independent capacity. In 1606 they were incorporated along with the grocers, and in 1617 they obtained a separate charter. They rapidly increased in numbers and importance from that time, and the almost helpless child of physic, soon attained to a manhood, that excited the jealousy of physicians, and called forth their strongest exertions of opposition.

It is natural to suppose that the tendency of such a body of practitioners would be to encroach on the real rights of physicians; the pharmacy of that day was too limited a sphere for them to revolve in, and although they possessed no power or right to receive fees for attendance, yet they sought to extend their medical practice, and derived their remuneration from the medicines they prescribed. Perhaps no more unfortunate concurrence of circumstances could have happened them in this arrangement for paying the apothecary. The temptation to **over-medication** was direct and positive; the inducement to **overcharge** was equally great, and for a long series of years, the English were over-dosed and over-charged, until the evil attained such magnitude as to call up a powerful reaction on the

part of the physicians, who, about the close of the seventeenth century, established dispensaries for the sale of simple medicines, and for compounding prescriptions, to which they sent their patients. At these establishments, medicines were sold at reasonable prices, and no exorbitance manifested in reference to prescriptions. They gradually acquired a degree of popularity that excited a bitter enmity in the apothecaries, whose sales and profits were materially curtailed by being confined chiefly to their own practice. When these dispensaries had acquired so firm a footing in public confidence, as to proceed alone, the physicians, whose aim had been solely to punish the apothecaries, severed their connection, and left the establishments in the hands of the class of persons, who, for a series of years, had taken charge of them, and devoted their time and talents solely to Pharmacy. These persons were the original pharmaceutists, or chemists and druggists of England, the progenitors of the very extensive and respectable body of men, now represented by the Pharmaceutical Society of Great Britain.

In 1794, so sensible had the apothecaries become of the progressive power and influence of the chemists and druggists, (a body of men, which they said in disparagement were unknown a century before,) that a general meeting of the metropolitan apothecaries was called at the Crown and Anchor tavern, to take measures to repress or circumscribe the chemists and druggists for their "unjust and innovating usurpation" of the rights and immunities of the apothecaries. One of the charges thus brought against the druggists was, "that were their aggregate profits divided amongst the apothecaries, as it ought to be, each of the latter would have an addition of 200 pounds sterling to his income. They spoke of this "evil" as not being confined to the capital, but as a morbid infection which had begun at the capital as a central point, and had diffused its deadly breath from thence to all the chief cities and towns; and

even hamlets and villages were not free from its influence." A committee was appointed, funds subscribed, parliament petitioned, but no *act* issued from that authority bearing on the interests of the druggists.

This movement of the apothecaries in 1794, appears to have been the primary cause of the combination of interests among the chemists and druggists of London, and may be looked upon as the germ radical of the Pharmaceutical Society, which association, however, did not come into existence till half a century after.

Quieted, but not satisfied, by their ill-success in 1794, the apothecaries again manifested their feeling by causing a bill to be introduced into Parliament in 1813, containing several clauses extremely objectionable to chemists and druggists, which was met by a general meeting of the latter, on the 4th of March of the same year. The committee appointed on this occasion, of which the late William Allen was chairman, acted in the most energetic and efficient manner. Funds were collected, an active correspondence established with their brethren in other cities of England and Wales, counter-petitions showered in on Parliament, which course soon exhibited its influence by the complete withdrawal of the offensive clauses, and left the chemists and druggists a much more united and consequently powerful body, than they were before, although as yet no bond of incorporation held them together. From this time, until 1839, no very important movements in reference to the English pharmacutists occurred. In the last named year, a committee of the House of Commons was appointed to institute enquiries in relation to the medical profession, with the view of reforming abuses, revising existing laws, &c. The extensive evidence collected by this committee, when nearly ready for publication, was destroyed by fire, but sufficient information was retained to enable the committee to bring in a bill for the registration of medical practitioners, &c., commonly known as Mr. Hawes' Bill. It was the feeling

and interest excited amongst the chemists and druggists of London by this measure, that more immediately brought the Pharmaceutical Society into existence, and the history of this Society since 1841, is in reality the history of Pharmacy in England.

In February, 1841, Mr. Hawes brought forward the Bill before alluded to for the reform of the medical profession, which appears to have originated chiefly with the apothecaries, or general practitioners, and which contained clauses injuriously affecting the interests of the chemists and druggists. The chief of these was aimed at the habit of prescribing at the counter, or recommending doses of medicine in simple cases, and for suggesting the propriety of a dose of calomel or rhubarb, or from motives of humanity to dress a wound; this bill rendered the pharmacist liable to \$100 penalty, recoverable by suit, or imprisonment in lieu.

Mr. Farmer, of London, having noticed the objectionable features of the bill, called a meeting of his special professional friends, who determined to publish a general call for a meeting to consider the subject, and take measures to defeat or modify the bill in its obnoxious points.

On the 15th of February, 1841, a general meeting took place, in which the most distinguished and influential chemists and druggists of London took part. Resolutions were passed deprecating the objects of the bill, requesting its mover to postpone the *second reading* for one month, and appointing a large committee to watch its progress, and adopt such measures as were wisest in the case.

The committee succeeded in the object of their appointment, by first causing the modification, and then the withdrawal of the bill, by a flood of petitions.

The union of feeling among druggists in all parts of England based on the correspondence of the central committee at London, formed a very admirable platform on which to erect a society designed to be co-extensive with the kingdom. It was, in fact, during the frequent meetings of this

committee that the idea of a National Society was broached, and the project talked of on several occasions. One of the great obstacles to such a design, in previous movements, had been the jealousy and mistrust that existed between the members of the pharmaceutical body in different cities, and even in the same place; but in this instance local prejudices seem to have been hushed almost entirely; and this chief difficulty removed, nothing was needed to establish an institution but a wise and efficient action on the part of the central committee.

One of the ostensible grounds for interference with the chemists and druggists, was their want of a scientific education, and of any regular means of instruction—charges which were but too true. Indeed, each establishment was an independent school for pharmaceutical study; innovations in the old routine were slow to gain credence, especially as no pharmaceutical organ existed on whose pages the dispensers could become acquainted with the discoveries of the day. In March, 1841, several members of the committee met at a “pharmaceutical tea party,” at Mr. Bell’s, and discussed the principles on which a society might be started, and on the 5th of April following, the committee met, and in a series of resolutions decided that the general interests of the profession required the formation of a Society; that this Society be founded forthwith under the title of the Pharmaceutical Society of Great Britain; that the objects of the Society be chiefly to benefit the profession by furnishing the means of proper instruction; to protect the individual and collective interests of the profession, and to relieve distressed members. They further resolved to call a general meeting of chemists and druggists for the purpose of forming a Society, &c.

In accordance with these resolves, a meeting was held at the Crown and Anchor tavern, on the 15th of April, 1841, whereat a report of the above mentioned committee was read, and it was resolved, on motion of William Allen, that

a *society be then formed*, called the Pharmaceutical Society of Great Britain.

After the meeting, the members of the committee to the number of *one hundred*, signed an instrument constituting themselves members of the Pharmaceutical Society of Great Britain, the list headed by William Allen, F. R. S.

Five thousand copies of the report were printed and circulated throughout the country.

Between this time and the 1st of June, the committee were engaged at frequent meetings in digesting a constitution and code of by-laws, and on that day, at a general meeting of chemists and druggists, duly convened, they were adopted in form, and the members of the committee constituted to act as the council until the meeting in May, 1842. To the energetic action of this body, must, in a large degree, be attributed the fortunate results which have followed the formation of the Society.

One of the chief causes concerned in producing the rapid growth of the Pharmaceutical Society, was the establishment of a *Journal* for the publication of its transactions. This periodical, now known as the "Pharmaceutical Journal," was commenced by Jacob Bell, its present editor, on his own responsibility, with a view to gratuitous distribution, as a vehicle of information to the profession. The first number extended to 34 pages, and contained a paper from the pen of the editor, on the constitution of the Society, which exhibited the designs intended by the council, and being spread far and wide, made known to the members of the trade throughout the island, the great and valuable objects of the Association. This essay defined the position of Pharmacy, and exhibited a succinct account of its condition in other parts of the world, in order to show how far behind many other civilized nations the English were in pharmaceutical reform. It proved clearly the vast advantages that result from combination in the promotion of our Scientific Art, and in qualifying members by the support

of a school of Pharmacy. It was designed to unite the chemists and druggists of England and Wales by one common and powerful bond, which should cause them to act in unison in repelling the attacks from without, by the advocates of medical reform; whilst they should by every laudable means remove the stigma that had been cast upon them by other branches of the medical profession—that they were ignorant and illy-fitted for the responsible business of Pharmacy.

“At the time that Mr. Hawes undertook to set the profession in order, (says Mr. Bell,) he was supported and urged forward by the advocates of a system, liberal on the one hand, and restrictive on the other. According to the plan laid down, a new order of medical men was to be raised up on the basis of the general practitioner or English apothecary, and although Mr. Hawes did not contemplate the annihilation of the existing medical institutions, his measures were calculated indirectly to undermine their influence, and reduce their power by creating another channel, open to all, by which professional rank and honor might be attained.”

“Whilst the profession was to be thus thrown open and purged from what are termed its ‘‘corruptions ;’’ it was also to be protected by means of stringent prohibitions, against unqualified practitioners, enforced by heavy penalties. These measures were chiefly levelled against the druggists, and were designed, among other objects, to settle the knotty question respecting ‘counter practice,’ which has been a subject of dispute from the time of the apothecaries of the sixteenth century to the present day. It was not supposed that druggists could make any effectual resistance on the occasion, as it was proverbial that they were a disunited body, and that they had no representative government or other means of concentrating their influence. On the other hand, Mr. Hawes and his party were backed by a large and influential association, (the Apothecaries,)

the ramifications of which extended throughout the empire, and which had the means of creating a sensation, by directing the power of the members in one channel when a simultaneous effort was desirable. A notion prevailed to a considerable extent in the medical profession, that the interests of the two parties were at variance, that in order to elevate and protect the *medical practitioner*, it was necessary to *subdue* and *restrain* the druggist. This prejudice had been handed down during nearly two centuries, and the jealousy which existed on both sides, had been a bar to any mutual accommodation or dispassionate argument between the two parties. The medical journals, and even the daily papers were constantly advocating some effectual legislative measures, and quoting cases illustrative of the ignorance and misdeeds of the druggists. Although these arguments were frequently one sided, and the cases highly colored, they were seldom answered, except, perchance, in an occasional anonymous letter, the pungency of which was extracted during its passage through the press. Pharmacy stood in a precarious position. Its real representatives—those on whom had devolved the chief responsibility of preparing and compounding medicines—were calumniated on every hand, and threatened with extraneous control and a variety of restrictions. Even their *right* to dispense prescriptions was called in question, and their other privileges were held on an uncertain tenure. Yet they possessed no acknowledged means of protection or representation, and although they were all sensible of the disadvantages of their anomalous position, none felt called upon to act for the general welfare. In this state of affairs, the bill of Mr. Hawes came before parliament, and the druggists suddenly aroused themselves from their state of apathy, and arranged a plan of defense which proved altogether successful.”

The course followed by the chemists and druggists, when they had gained their primary object, is worthy of all

praise. Instead of again sinking into apathy, or raising triumphant cries of exultation, they calmly and wisely examined into their real condition, and the causes existing among them for the outcries of their enemies. The maxim that "in union there is strength," was first adopted. The leading minds saw the wisdom of pursuing a plan which should unite in one body, the respectable chemists and druggists of the whole kingdom. The second was that they should resort to means for self education—for the improvement of themselves and the advancement of the art they represented; thirdly, that they should provide efficient means for educating the rising generation who, as assistants and apprentices, were numerous throughout the country; and finally, that a benevolent fund should be provided for the relief of disabled members who might be deserving of the assistance of their brethren. There were wise heads concerned in the formation of the Pharmaceutical Society of Great Britain. They knew well the nature of the material from which they had to build their edifice, and constructed it in relation thereto. Perhaps in no country where the number of pharmacutists is so great, does so large a proportion of those of inferior grade exist. For the better qualified to have drawn a magic ring around their limited numbers, by excluding all whose qualifications in scientific regards were too low, would have caused a division in the ranks at once, and made enemies of the majority. In movements of reform, numbers and means are all powerful; on many occasions the voice of an ignorant, equals in influence that of a qualified member, and as the intentions of the founders were catholic, they not only wished to improve themselves, and those that came after them; but to raise the standard of every existing druggist, if so be it were possible. They therefore, at first, opened wide the doors of entrance into the Society, requiring no further qualifications than acknowledged respectability, and the education usual at that day.

The constitution acknowledged as members :

1st. Chemists and druggists who are, or have been, established on their own account, and who shall subscribe the sum of two guineas annually.

2d. Confidential superintendents, who shall be elected by the council, and who shall severally subscribe the sum of two guineas annually.

3d. Honorary members, comprising medical and other scientific men, who are distinguished in branches of knowledge allied to pharmacy.

4th. Associates, who shall pay *one guinea*, and enjoy all the benefits except presence at general meetings and holding office.

5th. Apprentices, who, by paying one guinea annually, shall have the privileges of associates.¶

The educational objects of the Society were declared to be an elementary classical education—medical botany, chemistry, materia medica and pharmacy.

After the 1st of July, 1842, no person was to be admitted as a member or associate without having passed an examination in the above branches of knowledge, and no apprentice should be entitled to the privileges of an associate without having passed an examination in classical learning before his indentures were executed.

It will appear from this statement, that all were invited to enter the association who would contribute to its support. It is presumable that the original members include a great number of very ordinary pharmacutists; but, by joining the society they are in its favor, and *not* against it; they contribute to its support, and as the Journal is distributed to every member without separate charge, it follows that each of these inferiorly qualified members has thrust on him, as it were, all the benefits desirable from so excellent a periodical, communicating monthly the latest discoveries and improvements.

By the financial report to the annual meeting in 1842, it

appears that between the 1st of January, 1841, to the 31st of March, 1842, there were added to the Society 1670 members, and 2280 associates, yielding an income of more than \$22,000. With this large subscription, it is not surprising that the council of the Society have found themselves able to effect great changes in the formerly existing condition of things. The chief objects for which these funds were expended, were *rent, salary, wages*, the Journal, benevolent fund, increase of the laboratory, the museum, scientific meetings and the lectures.

The school of Pharmacy, a most interesting feature of the Society, was commenced by the appointment of three lecturers. One of the courses was on Medical Botany, and consisted of two lectures per week between May and July, at 8 o'clock A. M. A second was on Chemistry, from October to the end of March, one lecture a week at 8½ o'clock A. M.; and a *third* course on Materia Medica and Pharmacy, commenced in October and ended in March, one lecture per week at the last named hour; the lectures on Materia Medica preceded those on Pharmacy. Since the commencement of the school, the courses have been extended, and lectureships of Practical Chemistry and Practical Pharmacy added. The fees for lectures are \$2.50 for members and \$10 for those who are not. The time of holding the lectures will appear unusual to us who at that hour are entering on our day's business in earnest; but in London, where so large a proportion of the medicine consuming population turn day into night, the run of dispensing business commences at a later period in the day.

Perhaps there is no feature of the Pharmaceutical Society of more interest to those who partake in its privileges than the occasions styled "Pharmaceutical meetings." These are monthly reunions held in the evening at the Hall of the Society, at which all the members and associates are at liberty to attend. It is usual to invite guests of distinction, men of science, who feel an interest in the Society, or in the sciences

it was instituted to promote, to be present and take part in the discussions. Occasionally lectures are delivered on some new and strikingly interesting subject. The numerous list of members affords an abundance who are willing to devote a portion of time to increasing the interest of these meetings, and rendering them attractive. Chemicals, Pharmaceutical, Botanical, and Materia Medica specimens, scientific apparatus and illustrations, are among the objects of interest to be met with at the rooms at Bloomsbury square, and we frequently observe that these contributions are sent from remote parts of England or Scotland. There is but one business meeting at which all the members are admitted, which is called the *annual* meeting, and occurs in May. The officers and council of the Society are elected annually on this occasion. The council or executive of the Society meet monthly. It is clear, that unless some other occasions were furnished for the intercourse of the members, calculated to promote fraternal feeling and enable them to compare sentiments, one chief object of the Society would have been defeated. The Pharmaceutical meetings, by their informal character, and real interest, supply this requisite, as to time, place, and attractiveness, and have certainly contributed to promote the cause of Pharmacy in England.

The Pharmaceutical Journal has already been alluded to. What the scientific meetings are to London and its vicinity, this periodical has proved to the provincial cities and towns. It was a sagacious move in the founders to so arrange the contribution of the members as to include the price of the Journal, and thus compel all to take it, and most of them to read of the progress of the parent Society, and of the improvements and discoveries of the day. There can be hardly a doubt that the Pharmaceutical Journal, as conducted by Jacob Bell, has been and continues to be the greatest boon that has fallen to the lot of the English Pharmacutists as a whole. Its character is unique. No

other Journal with which we are acquainted presents so many peculiarities adapted to advance and elevate the condition of our profession and its votaries among a people like the English. The Editor is constantly seen in its pages—his watchful eye is over every interest—now commenting upon the action of Parliament in reference to medical legislation, or advocating the rights of the druggist pending a suit at law brought against him by the Apothecaries' Society, or perhaps attacks on his own Society by other writers. In England the rights of incorporated bodies are more generally insisted on than with us, and their privileges are looked after with a jealous watchfulness hardly paralleled in the United States. The Editor often finds employment for his pen in exposing corporative policy, and in giving advice to his brethren in reference to conduct in particular cases.

The Transactions of the Society, or the official statements of the progress of the institution, are published in this Journal, and comprise the proceedings of the annual meetings, the report of the council, the special acts of that body, and the transactions of the Pharmaceutical meetings. Besides these and the editorial matter, lectures on new and important subjects, and matter selected from cotemporary periodicals of the continent, are found in its pages.

One of the later additions to the usefulness of the Society, is the laboratory established under its auspices in 1845 for the study of *practical* Pharmacy and Chemistry. In 1832 when the trustees of the Philadelphia College of Pharmacy were about to erect the building in which we are now convened, it was suggested to fit up a room for a practical laboratory, where the members might resort to experiment, or to manufacture chemicals of the finer sorts—the apparatus to belong to the College, and the members to pay a fee for its use sufficient to keep it in order. The policy and advantages of this movement were called in question, however, by those who had the chief direction of

affairs. With the continental pharmacies, laboratories are generally connected, where the apprentices acquire in regular course the familiarity with manipulation so necessary in the pursuit of chemistry, either economical or scientific. In England, however, to even a greater extent than with us, the chemist and druggist depends on the wholesale dealer and manufacturer for his chemicals, and but little provision is made for the instruction of the juniors in practical chemical knowledge. In the school of the Society, the courses are short, and with a great many of the pupils opportunities for experiment are few and far between. In view of this, the council of the Society perceived the advantages that must eventually arise from the establishment of a practical school under the supervision of the Professors of Chemistry and Pharmacy, where the student could put in practice the precepts of the lectures. It also would afford a means to medical students and to amateurs to acquire a kind of information and skill only elsewhere to be found, within the precincts of the manufactory or Pharmacy, into which, for this purpose access is always difficult and often impossible, for temporary applicants. With the large income of the Society, the Council were enabled to create a laboratory establishment of the most complete kind, furnished with all the appurtenances afforded by the metropolis, and for convenience and comfort not surpassed by any of the much celebrated European laboratories. The arrangements accommodate about 30 students. The rooms are open from nine o'clock in the morning until six in the evening, for five days of the week, and on Saturday, the studies are conducted in the Library and Museum. The pupils are required to quit the laboratory at 6 o'clock P. M. that the assistants may have time to proceed with the arrangements and cleansing for the following day. The Professor assigns to each student the operations he is to perform, and directs the manner in which he is to do it. Store rooms are in connection with the laboratory, contain-

ing a stock of materials from which the pupils are furnished at the order of the Professor. No extra charge is made for using the apparatus, except for wilful or culpable neglect or injury. The products of all the operations are the property of the Society. On entry each pupil has a working table, and the necessary special apparatus assigned him, and for which he is held responsible. Since the commencement of this school in 1845 the class has varied from 25 to 40 per annum, and the fee, at first 40 guineas, has been reduced to 32 guineas for the term of ten months. A number of young men have left it, well qualified by their education to advance the interests of their profession.

By the annual report for July last, we learn that the practical school is in a flourishing condition, and that the majority of the pupils are from other parts of England, which is an encouraging feature.

Since the successful operation of the parent Society and School at London, the Chemists and Druggists of two other cities of England have established associations with the same object. The Bristol Association have made an arrangement with a medical school in that city, whereby their students can attend lectures on Chemistry, Materia Medica, and Botany; and in Liverpool the profession have just formed a society, and have announced gratuitous lectures by scientific gentlemen, no doubt as an experiment preliminary to a more permanent establishment. This plan of local associations will do away with one great difficulty of the parent society, viz: the great inconvenience of young men going up to London to finish their education. It will have the effect, undoubtedly, to diminish the number of country members, but London and its vicinity will afford a full support to the school there, and its superior facilities will yet remain as an inducement to attract the better class of the students from the provincial schools.

The Council of the Pharmaceutical Society have been

fortunate in securing the services of men of the highest qualifications for their school—Fownes, Pereira, Thompson and Redwood. Two of these, Fownes, and Anthony Todd Thompson, have deceased, and the burthen of the school now devolves on Pereira, Redwood, and Mr. Bentley, the successor of Prof. Thompson, in the chair of botany. Of the former, nothing need be observed; he is too well known by his *Materia Medica*, and his numerous contributions to the Journals, to need notice. His colleague, Mr. Redwood, now occupies the two professorships of Chemistry and Pharmacy, having assumed the duties of the late Mr. Fownes. Mr. R. is a Pharmaceutist by education; his sympathies are with his profession, and perhaps no one could be found better qualified to carry out the very important branches of instruction placed in his charge.

I think we may infer, from the statements that have been made, that the future prospects of our art in England are flattering. The emulation at present existing, the field for ambition that opens before the younger and better qualified, in the direction of Chemistry, will tend to its advancement, as well as to that of Chemistry, itself, and leads us to wish it was in our power to promise as fair a prospect for our own professional improvement in a national sense.

W. P. Jr.

ART. II.—ON CANTHARIDAL COLLODION.

Translated from L'Abeille Médicale.

WITH OBSERVATIONS.

BY CHARLES S. RAND.

“Collodion, combined with cantharidine, appears to be employed with the most complete success as an epispastic remedy. It not only can be substituted for the ordinary preparations of cantharides, but offers the additional advantage of not requiring the employment of leather or linen, so necessary for the application of the latter. Its use is parti

cularly recommended as affording the means of placing a blister upon otherwise inaccessible parts of the body, or in situations from whence the movements of the patient might easily displace an ordinary plaster, destroying the required action, or at least removing it to another part.

"In using this preparation, it is sufficient to apply, by means of a camel's hair pencil, a layer of the liquid to the spot upon which the vesicating influence is desired. If, after dessication, which takes place in one or two minutes, it appears that the part is not entirely covered, the same operation should be repeated. A more certain and rapid action may be secured by the subsequent application of a little lard or simple cerate over the pellicle. More time is not required for the production of a blister with this preparation than with ordinary vesicating agents, and it moreover offers the advantage of being entirely unaffected by the movements of the patient.

"Mode of Preparation.—Treat, by the process of displacement, one pound of bruised cantharides, with one pound of sulphuric, and three ounces of acetic ether. In two ounces of this saturated ethereal tincture, dissolve twenty-five grains of cotton powder.

"So simple a process can be performed with ease in any pharmaceutical laboratory. In glass stoppered bottles it may be preserved unaltered for any length of time.

"Although intrinsically much more valuable than ordinary vesicating agents, its use is less costly, inasmuch as with one drachm and a half of collodion, an effect is obtained equal to that of half an ounce of blistering plaster. Repeated experiments, by physicians, with the cantharidal collodion have verified these statements."

The above paper was communicated by the Russian chemist, M. Hisch, to the "*Med. Zeitg. Rusl.*," and thence republished by the French journal, from which it is here translated. The portability, ease of application, and vesi-

cating power of this preparation, render it superior to ordinary vesicants, while the facility with which irregular surfaces may be evenly coated, so as to secure uniformity of action, is a prominent advantage. I have made many experiments with it, all confirming the statements of Mr. Hisch in its favor. It is speedy, convenient and powerful. Some improvements, however, might be made in its formula. The proportion of cantharides is unnecessarily large, a tincture made with double the amount of ether, being found to vesicate with equal power.

The contractility—a property possessed by all simple solutions of gun cotton in ether—is a serious objection, not only causing considerable pain to the sensitive vesicated surface : but retarding the action of the preparation. It is probably to relieve this that Mr. Hisch recommends the application of lard or simple cerate. I had at first supposed that a sufficient amount of oily or fatty matter existed in the cantharides to prevent this unpleasant result ; but experience proves the contrary. The addition of Venice turpentine to the amount of about one per cent., effectually prevents this contraction, and renders the preparation perfect.

Two small circles of equal size upon the arm were coated ; the one with collodion, prepared according to M. Hisch's formula ; the other, with that modified by the addition above suggested. The former contracted powerfully, causing a constant painful impression upon the part, and did not vesicate until two or three hours after the latter, the pain from which was insignificant.

When the blister is perfectly formed, the film of collodion loosens, and curling at the edges, may, by a slight effort, be detached without rupturing the membrane beneath, whose surface contrasts very favorably with that produced by ordinary blistering plaster, which so frequently soils the skin.

If it be simply painted upon the skin, and the ether



allowed to evaporate, vesication does not take place sooner than with the officinal plaster: but if immediately upon its application a piece of oiled silk is bound upon the part, and suffered to remain an hour, so as to prevent rapid desiccation, a blister will be formed in three hours, sometimes even more quickly, and in one instance, in *one* hour.

The medical gentlemen of this city who have used this preparation, speak in high terms of its satisfactory performance, or, in the language of M. Hisch, "Repeated experiments by physicians with the cantharidal collodion have verified these statements."

ART. III.—SUGGESTED FORMULA FOR UNGUENTUM TABACI.

By WILLIAM J. ALLINSON.

I have for a number of years prepared the Unguentum Tabaci exclusively by a private recipe, (the physicians prescribing it being of course advised of its character,) and the ointment so prepared has been in great repute among my customers as a remedy for a "gathered breast." The success attending its use has induced persons removing from my vicinity to speak of it, so that I have repeatedly received orders for it from places hundreds of miles distant.

I subjoin my formula, which I offer to the notice of the Committee on the Pharmacopœia.

Take of Tobacco leaves, (sliced)	-	-	℥x. *
Cider vinegar,*	-	-	Oiv.
Basilicon ointment,	-	-	℥xiiij.

Boil the tobacco in the vinegar to one pint—strain—reduce in a water bath to f.℥vj., and add this fluid extract to the melted ointment, stirring constantly till it is cool.

*I have employed pure cider vinegar of my own manufacture, which probably improves the consistence of the extract. The officinal dilute acetic acid would perhaps be better, as affording a *uniform* result.

On the suggestion and by the prescription of Dr. Joseph Parrish, I have recently kept an "Unguentum Tabaci Composita," for which I offer the following formula:

Take of Basilicon ointment,	-	-	-	℥xiiij.
Powd. camphor,	-	-	-	℥j. et ʒv.
Extract of belladonna,	-	-	-	℥ij,
Fluid ext. of tobacco, (made as above,)				fʒvj.

Dissolve the extract of belladonna in the fluid extract of tobacco, and add to the melted ointment, in which the camphor should be previously dissolved. Stir constantly till cool.

Dr. Parrish, in the late number of his "New Jersey Medical Reporter," in an article on "Milk Abscess," after referring to the employment of warm vinegar by the late Dr. Dewees, speaks favorably of the tobacco ointment prepared as above, and states that "after repeated trials, with a variety of unguents and liniments," he had abandoned them all except the above compound ointment, which, says he, "I use in nearly every case of mammary abscess, and generally with entire satisfaction."

I may remark that I have not known of a single case of disappointment from the use of the simpler ointment. I conclude with extracting the following passages from Dr. Parrish's Essay:

"The Belladonna is not always used, though I do not know that it is ever inadmissible. The tobacco ointment was first introduced to my notice by Wm. J. Allinson, an apothecary of this city,* who makes it in a manner somewhat different from the officinal formula: the menstruum used by him being vinegar instead of alcohol, as directed by the U. S. Dispensatory, thus meeting in some measure the suggestion of Dr. Dewees." * * * * *

"It frequently affords relief even after the acute, lanci-

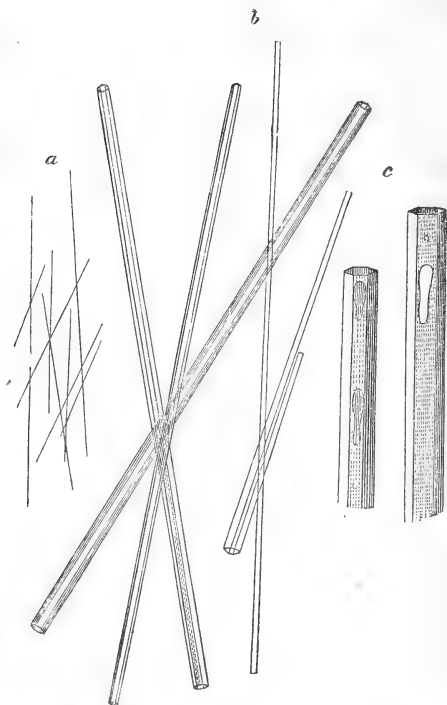
* Burlington, N. J.

nating pain and chill, which characterize the onset of the suppurative stage having been developed, and the tumor presents that glazed appearance which precedes the pointing of the abscess. I have a lady under treatment at this time who has suffered from milk abscess after each of her confinements, (four in number,) so that the breast has become entirely useless to her; not being aware of this fact when she came under my care a few weeks since, my attention was not particularly directed to the breasts, till on one of my visits, I found she had had a chill, followed by fever, and sharp, cutting pains in the left mamma; the gland was much swelled, and just under the nipple was a shining protuberance indicating the locality for pointing. A muslin cloth the size of the gland, was spread with the ointment, and the whole surface covered with it immediately,—the nipple presenting through an opening in the muslin. In about twenty-four hours, the application being frequently repeated, the pain and induration were partially relieved, and the patient gradually recovered. Within the last two years I do not recollect to have seen a “gathered breast,” though my opportunities for meeting with this form of disease have been four fold, in comparison with any former period—but I have frequently seen in that time the mammary gland swelled, painful, and threatening suppuration. Constitutional means are not of course omitted in cases where their usual signs are present.”

ART. IV.—NOTICE ON THE FORMATION OF SOME CRYSTALLINE BODIES IN COLLODION.

By JOSEPH LEIDY, M. D.

Mr. Edward Parrish, pharmacist, of this city, a short



Reference to the Figures.

- a. Long acicular crystals from collodion, as they appeared to the naked eye.
- b. The same, highly magnified, exhibiting their hexahedral prismatic character.
- c. Extremities of some of the larger crystals, highly magnified, presenting the appearance of the enclosed bubbles of liquid collodion.

time since brought to me for microscopic examination, a specimen of collodion or ethereal solution of gun-cotton, desiring to know if it was crystalline in its constitution as has been asserted.

The gun-cotton from which the collodion had been made was prepared by Mr. Parrish, by means of pure nitric and sulphuric acids, according to the formula given by him in some "Observations on Collodion," in the last number of this Journal, page 290.

The specimen, as presented to me, was about one ounce in quantity, contained in a glass-stoppered vial, was viscid, perfectly clear, and without sediment. Upon examination with the microscope, we could detect nothing, even with a power of 1200 diameters, except a finely and faintly granular constitution. The bottle remained upon my table for four weeks, when, upon examining it accidentally, I observed a deposit of a whitish flocculent matter at the bottom, and passing in various directions through the supernatant liquid numerous very long, delicate, acicular, shining crystals. Some of these were full an inch in length. Upon submitting them to the microscope, I found them to be transparent, highly refractive, hexahedral prisms, with truncated or pyramidal summits, measuring from the 1.6000th inch to the 1.857th inch in diameter. Very many of the larger crystals, near the extremities only, enclosed bubbles of liquid collodion, as represented in fig. c.

The flocculent sediment consisted of some undissolved cotton fibres, some very fine fragmentary filaments of the same, a few fine starch granules, vegetable epidermoid cells, a few spiral vessels, spiral fibre cells, and numerous crystalline bodies. Among the latter were many regular octohedrons, the largest of the perfect ones measuring at the sides 1.882d inch; when larger than this two or more of the angles were truncated. Some of the largest of the latter measured as much as 1.397th inch. Four-sided prisms with pyramidal

summits; cubes, measuring 1.500th inch, and four-sided tabular prisms.

The constitution of these various crystalline bodies I will not pretend even to conjecture, leaving this subject to the consideration of the chemist.

ART. V.—THE NATURAL HISTORY OF THE CINCHONAS.

Extracted from a work on this subject by M. Weddell.

In 1843, M. de Castelnau, having been commissioned by the French government to undertake a scientific expedition into the interior of the provinces of Brazil and Peru, the Museum of Natural History of Paris appointed M. Weddell to join the expedition, with special instructions to investigate several important botanical subjects, and other branches of natural history. After conjointly prosecuting these investigations for two years, M. Weddell separated from M. Castelnau, on the confines of Mattogrosso, in order to pursue his researches in another direction, and these researches he continued until 1848. The question of the cinchonas, which has been so much discussed, and is still so obscure, particularly fixed the attention of M. Weddell. It was with reference to this object that his course was principally directed, and the results of his laborious researches form the subject of the work alluded to in the heading of this paper. This important work, which, when finished, will form a magnificent folio volume with numerous engravings, appeared to us so important in a pharmaceutical point of view, that we did not wait its completion before giving some account of it. M. Weddell with much kindness having placed at our disposal the first sheets of his work, we have extracted some details, which will indicate the general character of

the work, and will excite much interest in the talented young man whose zeal, intelligence, and courage have accomplished so much.

Since the time of Condamine, who was the first to describe the cinchonas in Europe, until the illustrious travellers Humboldt and Bonpland, to whom we are indebted for the earliest accounts of the geography of this class of plants, a number of learned men of all countries have made this the object of their researches; and a catalogue alone of the works published on this subject would occupy many pages. But only a small number of those who have described the cinchonas have studied them in their native country, and it is the observations of these few which have furnished matter for the greater part of the other writers.

The origin of the bark of the cinchona was for a long time a mystery. It was Condamine who first threw any light on the subject, and to this further additions were but slowly made. Joseph de Jussieu in 1735 accompanied as botanist the Commission of the Academy of Sciences sent to measure a degree of the meridian under the equator. He visited about the same time as the celebrated astronomer, the cinchona forests of Loxa, those of high Peru, and almost penetrated into the frontier of Brazil. A succession of unfortunate accidents prevented the publication of the results of his researches. He did not return to Europe until 1771, after an absence of thirty-six years, and was then deprived of his reason.

Thirty years later, two expeditions were engaged to explore the cinchona regions in lower Peru and New Granada, the one directed by the celebrated Mutis, the other by Ruiz and Pavon. The immense investigations of these naturalists did not advance the history of these plants as much as might have been expected. Since the observations of Messrs. Humboldt and Bonpland, who visited the same country subsequently, the region from which the cinchonas are exported has been greatly increased, in consequence of

the discovery of new districts, and commerce has been enriched by several new species.

Previously to the year 1775 Loxa bark was the only kind of cinchona known in commerce. It was not until 1772 that Mutis discovered the valuable tree in the neighborhood of Santa Fé de Bogota, and at this period Europe began to receive cinchonas direct from the ports of New Granada, on the Atlantic. Some years later, the authors of *Flora Peruviana* studied the species of lower Peru, to the north of Lima, and these also were introduced into commerce. The only species, then, which, botanically speaking, still remained unknown in Europe, were those growing in the vast extent of country extending southward. Notwithstanding the efforts of Joseph de Jussieu and the botanist Taddaeus Haenke, little was added to the scientific knowledge of the cinchonas by their travels. The object of M. Weddell's work is to make known the species which have come under his observation in these regions during the years 1845, '46 '47. The immense commercial demands on the cinchonas of these parts, tending to exhaust the forests, rendered it necessary that new sources should be discovered. At a period when the consumption of these barks was becoming more and more considerable, it was desirable that attention should be directed to those cinchonas which will have to replace the Calisaya bark, the supplies of which are becoming less abundant. These species although they may be less rich in active principles, yet, from their abundance offer some security against the prospect of our being deprived of one of the most valuable medicines of the vegetable kingdom.

M. Weddell penetrated into Bolivia in the month of August 1845, through the country of the Chiquito Indians. The formation of the country in this province is quite incompatible with the existence of the true cinchonas. The greater part of its surface is so low and flat, that during the rainy season it is completely inundated. In the month of

November he journeyed towards the South, gained the Rio Grande, and crossed the country of the Cordillera, as far as Tarija, where he arrived in January 1846,—a laborious journey, the object of which was to determine with correctness the southern limit of the district of the cinchonas. M. Weddell gave the name of *Cinchona Australis* to a species which he discovered, like a distant sentry, at this extreme point, near to the nineteenth parallel of south latitude. In the month of August following he visited some of the large towns of Bolivia. At Cochamba a curious phase of his expedition began. He traversed near there the great chain of the Andes, purposing to reach La Paz, where the cinchona commerce is carried on to the greatest extent. The Andes present, at this part, a long and fine series of natural steps, by which the traveller gradually descends, passing successively in review all the varieties of climate, and all the corresponding shades of vegetation. The different species of cinchona are rapidly presented to observation. Almost immediately on his entering the province of Enquisivare he had the opportunity of studying the trees which produce the Calisaya bark, the most valuable of all the species in consequence of the large proportion of quinine which it contains. He gave to this tree previously unknown, the name of *Cinchona Calisaya*. At Palca he learned that there was recently discovered, on the borders of the Rio Ayopaya, an immense forest of cinchonas which no one had yet explored. But it was in the province of Yungas, the richest and most fertile of the provinces of Bolivia, that he obtained the most precise information of the mode of procuring, preparing, selling, and adulterating the barks which he wished to study.

In 1847, after the rainy season, M. Weddell resumed the road of the great Cordillera. The town of Sorata, or Esquibel, situated on the eastern side of the Andes, and at the foot of one of its highest peaks, is considered one of the most prolific sources of the Bolivian cinchonas; but is, in fact, only a simple point of transit for the products of the valleys

of the interior. It was toward these that he directed his course, passing through the snows of Illampo. The Rio Tipoani, the Rectola of Bolivia, takes its origin here. One of the most dangerous roads conceivable is that along the ravine bearing the above name, and leading to the village of Tipoani, a pestilential place, which nothing but the love of gain could render habitable. The cinchonas met with in all parts of this region are as much sought after as gold itself, but the larger trees are already beginning to disappear. In order to study the yet undetermined points, M. Weddell embarked on a raft constructed for the purpose, on which he descended in safety the rapids of Rio Tipoani. He then visited the mountains of Rio Tumache. This expedition being terminated, he reascended the Rio Mapiri on his raft, and then took the route across the forests leading to Aten and Apolobamba, where he arrived exhausted with fatigue and overcome with the fever which he had caught in the regions of Tipoani. The country here assumes a more agreeable aspect. The forests have disappeared, or occupy only the horizon; the eye rests on pretty grassy slopes, interspersed with scattered shrubs, and frequently with charming groves. Here several species of cinchonas are met with, which scarcely exceed the shrubs in height, and of which the flowers embalm the air with their delicious perfume. The town of Apolobamba is the centre of one of the districts of Bolivia which was first explored. For a long time its forests have been stripped of cinchonas.

At the end of July 1847, M. Weddell visited the province of Coraboya, one of the most interesting in Peru. It is divided by the Cordillera into two regions, one of which comprehends a long series of valleys, which furnish the greater part of the cinchonas now exported from the Peruvian Republic. It would be difficult to give an idea of all the vegetable treasures buried in these solitudes. The thirst for gold originally peopled this district, but the forests have re-

gained their empire, and the hatchet of the *cascarillero* now alone breaks the silence.

We will here quote the words of the talented author: The name of *cascarilleros*, says M. Weddell, is given to the men who cut the cinchonas in the woods; an appellation equally applying to those who are specially engaged in this commerce. The former, and of these alone I will speak here, are in general men who have been brought up to this laborious occupation from their infancy, and are accustomed by a kind of instinct to guide themselves in the midst of the forest. Without any compass but that intelligence peculiar to man in a state of nature, they guide themselves unerringly in these labyrinths as if they were surrounded by an open horizon. But how often does it happen that those less experienced in this art lose themselves and are never more heard of!

The only period which is not suited for the collection of cinchona bark is the rainy season, which in duration corresponds in some respects with our winter. If some persons contend that the period of the ascension of the sap is the best for stripping the trees, their precepts are certainly not practically adopted, for even during the rainy season the collection of the bark is only suspended on account of physical obstacles to its continuance.

The cutters are not generally engaged on their own account, but are mostly in the service of some merchant or small company. A confidential person is sent with them into the forests, who is called the *major domo*. It is his duty to receive and examine the barks which are brought to him by the different parties in the forest, and to superintend the distribution of the provisions.

The first thing done by those who engage in this kind of speculation in a region previously unexplored, is to have it examined by experienced *cascarilleros*, who are called *diestros* or *practicos*. The duty of these is to penetrate the forests in different directions, and to ascertain to what points

they may be profitably explored. They are expected to state whether there are any cinchonas, and in what quantity; also to point out the direction in which trees are to be found, and to report on the quality of specimens of the bark obtained.

This preliminary investigation is very important, and requires the possession of much sagacity, patience, and experience in those who are engaged in it. It is upon their report that the chances of success are calculated. If it be favorable, a road is immediately commenced up to the point which is to form the centre of the operations; and from this time all those parts of the forest adjacent to the road become provisionally the property of those who have formed it, and no other *cascarilleros* can work there.

On the arrival of the *major domo* with his cutters in the neighborhood of the part to be explored, he chooses a favorable site for his encampment, as near as possible to a spring or river. He constructs a hut or slight house to shelter the provisions and the produce of the cuttings; and if he anticipates to have to remain for some time in the same locality, he commences the cultivation of maize and a few vegetables. Experience, indeed, has shown that an abundant supply of provision is one of the most important conditions of success in this class of undertaking. The *cascarilleros*, during this time, are distributed through the forest, one by one, or in small parties, each carrying under a small cloak, and suspended at his back, provisions for several days, and the coverings which constitute his bed. In this way these poor beings have occasion to put in practice all their courage and patience in order that their work may prove fruitful. Obligated to have the hatchet or knife continually in his hand, to disembarass himself of the numerous obstacles which arrest his progress, the *carscarillero* is exposed, from the nature of the circumstances by which he is surrounded, to an infinity of accidents which too often endanger his life.

The cinchonas rarely constitute an entire forest, but form groups more or less compact, distributed in different parts of it. The Peruvians give these the name of *manchas*. In some cases, and most frequently, they grow separately. However this may be, it is in discovering them that the skill of the *cascarillero* is principally exerted. If the position be favorable, the tops of the trees first attract his notice; a slight movement peculiar to the leaves of certain species, a particular color of the foliage, the aspect produced by a great mass of inflorescence, enable him to distinguish the cinchonas from a great distance. Under other circumstances he confines his inspection to the trunks, of which the external layer of the bark, or *enves* as it is called, presents remarkable characters. Very frequently the dry leaves which he finds on the ground are sufficient to indicate to him the vicinity of the object of his search; and if these indications have been brought there by the wind, he knows in what direction to look. An Indian, under these circumstances is an interesting object for observation. Passing in and out through the narrow pathways of the forest, glancing through the foliage, and appearing to sniff the earth, he seems to walk like an animal pursuing its prey, and darts forth when he thinks he has discovered the object of his search, nor stops until he has arrived at the foot of the trunk which he had descried from the distance. It is not always, however, that the exertions of the *cascarillero* are productive of such favorable results. Too often he returns to the camp empty handed, and without provisions; and not unfrequently, when he has discovered on the side of a mountain indications of the tree, he finds himself separated from it by a torrent or ravine. Entire days may then pass before he can attain the object which, during this period, he allows not to escape from his sight.

In order to strip the tree of its bark it is felled with a hatchet, being cut a little above the root, and the bark previously removed from this part, so that nothing may be lost;

as at the base the bark] is thickest, and therefore most profitable, it is customary to remove the earth from around the trunk, so that the barking may be more complete. The tree seldom falls immediately when cut through, being sustained either by climbing plants or by the adjacent trees; these are fresh obstacles to be overcome by the *cascarille-ros*. I remember having once cut the trunk of a large cinchona in the hope of bringing its flowers within reach, and, after having felled three adjacent trees, had the mortification to find it yet standing, being held up by the interlacing creepers.

When at length the tree is down, and the useless branches have been cut off, the peridermis is removed by striking it, either with a little wooden mallet, or even with the back of the hatchet; and the inner bark, being thus exposed, is often further cleaned by means of a brush. The bark is then divided by uniform incisions circumscribing the pieces which are to be removed, and these are separated from the trunk with a common knife or some other instrument, the point of which is carried as close as possible to the surface of the wood on introducing it into the incisions previously made; and if the position of the trunk prevents the operator from removing the whole of the bark by the first operation, it is subsequently divided so as to admit of its being turned. The dimensions and regularity of the pieces necessarily depend more or less on circumstances; in general, however, for the convenience of transport and facility of preparation, they endeavor to make them from fifteen to eighteen inches long, and four or five inches wide. The bark of the branches is separated in the same way as that of the trunk, excepting that it is deprived of its exterior coating or peridermis.*

*Formerly, with very few exceptions, the bark deprived of its peridermis was not received in commerce; not that any virtue was supposed to exist in that part, but it furnished distinctive characters by which it

The details in the process of drying also vary slightly in the two cases; the thinnest pieces of bark from the branches or small trunks, intended to make the quilled cinchona, are simply exposed to the sun's rays, and of themselves take the desired form, which is that of a hollow cylinder; but the bark taken from large trunks, which is to

was easily known, and rendered difficult of substitution. The necessity which was thus imposed upon the *cascarilleros* of preserving this, in many cases, frail part, demanded on their part the greatest care. Thus in many places it was the custom to fell the tree two or three days before barking it, so that, desiccation having commenced, the different layers of bark might adhere together.

I think that the removal of the peridermis from the surface of the thick barks at the time of cutting, is not quite general. Some of the cinchonas of New Granada, which I have recently seen, retained the outer coating. However this may be, we perceive the necessity of studying the bark under both aspects. I am persuaded that many museum specimens, collected at a period when it was customary to preserve the peridermis, would no longer be thought of doubtful utility, if considered in this point of view.

The process formerly employed for separating the young barks from the wood, also differs much from that which is now practised; hence there is a certain difference in the formation of the cylinders prepared by the two methods. I have already described the way in which it is now done, and it is easy to understand that by this method the dimensions of the separated pieces may depend on the patience or skill of the *cascarillero*, or on the circumference of the branch or trunk from which they are taken. Formerly, on the other hand, each piece was cut by one operation, the *cascarillero* holding his knife by the two extremities, and drawing it rapidly towards him. The flat pieces obtained in this way necessarily varied in width, according to the size of the trunk from which they were taken, and the quills when dried were frequently no larger than a pen. The pieces also had sharp edges, and they were thicker at the centre. The defect of this method was the immense loss which resulted, for nearly as much bark was left on as that which they removed, the former being considered useless on account of its being deprived of the peridermis. But this loss was as nothing when compared with that which I have next to notice. I allude to the almost entire rejection, for some time, of the bark of thick trunks. The loss resulting from this cause was immense. Many of those experienced in this subject having affirmed that with age the

constitute the flat cinchona, or, as it is called, *tabla* or *plancha*, must necessarily undergo a certain degree of pressure during the process of desiccation, without which it would become mis-shapen, or take a cylindrical form as in the preceding case. To effect this, after first exposing the pieces of bark to the sun, they are placed one on the other in crossed squares, in a similar manner to that practised in timber-yards in the arrangement of the planks of wood, and on the top of this pile a heavy weight is placed. This process is repeated for several days until the bark is completely dried.

The above process is that commonly adopted in preparing the cinchonas; but it will be easily comprehended that this must vary, in some degree, according to the locality, or the nature of the tree operated upon. In many places the bark is not pressed at all, or but imperfectly so, and it is then generally out of form or slightly curled. The peridermis is often but partially removed, or simply scraped. Finally, whether it be accidental, or whether it be done with the view of augmenting the weight, there frequently remains a certain quantity of moisture in the bark which greatly deteriorates it. It thus appears that cinchonas which would

juices disappear by degrees from the bark, and that those barks only are efficacious which are taken from branches of moderate size, four times as many trees were sacrificed as would have been the case under other circumstances. It has been said, it is true, that the *cas-carilleros* climbed the trees to cut off the branches, taking care to leave the terminal branch; but those whom I have known have always candidly confessed that they found the most simple method to be that of cutting the trees down, and this, I believe, has been the uniform practice. Thousands of quintals of cinchona bark have been thus left to perish in the forests; and it has only been since the inutility of the practice has been proved by chemical analysis that it has been discontinued. It is not to be considered, however, that the bark of old trees contains as much of the active principle as those which have only arrived at maturity. There are limits between which all are good; indeed, none ought to be rejected.

have presented the same characters if similarly prepared, may, according to the circumstances, vary very greatly. In any of these cases the labor of the *cascarillero* is by no means ended, even when he has finished the preparation of the bark; he has yet to carry his spoil to the camp, and with a heavy load on his shoulders, to retrace his steps along those parts which, while unburdened, he traversed with difficulty. The labor involved in this part of the operations can hardly be conceived. I have seen more than one district where the bark has to be thus carried for fifteen or twenty days' journey to get it out of the wood from which it was obtained; and considering the amount of remuneration received, I could hardly imagine men so unfortunate as to engage in work so laborious and ill-paid.*

Something yet remains to be said with reference to the packing of the bark. It is the *major-domo* who performs this duty. As the cutters bring him the bark, the produce of their labor, he submits it to a slight examination, and rejects that which is bad. It is then, if necessary, exposed to a fresh process of desiccation, and formed into bundles of nearly equal weight, which are sewn up in coarse canvass kept for that purpose. In this condition the bundles are conveyed on the backs of men, donkeys, or mules, to the depôts in the towns, where they generally receive an exterior envelope, consisting of a fresh hide, which as it dries makes a hard and compact package. In this form the packages are known by the name of *serons*, and it is thus that they arrive in Europe. The usual weight of a *seron* is from 70 to 80 kilogrammes (kilogramme 2 lbs. 3 ozs.

* In general, before the product reaches the coast it passes through at least three or four hands, and on each occasion its price is augmented; moreover, as carriage is very expensive, it follows that the price charged in Europe will afford no idea of its cost on the borders of the forest. At Pelechuco, for instance, 1 kilogramme (2 lbs. 3 ozs. avoirdupoise) is only worth a franc and a half (fifteen pence,) and for this twenty francs are now paid in Paris.

avoir du poids ;) but the weight is sometimes much less than this. From these details it will be seen how erroneous the notions of some persons still are with reference to the collection of cinchona bark ; many having thought that it continues under special surveillance as it was formerly represented to be ; and others that the cinchona-trees are cultivated in enclosed parks and treated as the cork trees of our country. It must be acknowledged that the mode of collecting this valuable product appears to be always under the control of the half-savages by whom it is performed ; and if efficient means be not discovered of counteracting the ruinous and wasteful method adopted, our descendants will inevitably have to regret the entire or at least partial extinction of the different varieties of cinchona.

The opinion of those who calculate upon the forests being restocked from seeds, and from suckers thrown out from the stumps of the fallen trees, is more nearly in accordance with truth ; but, as will be seen, even this source of renewed supply can only be depended upon to a certain extent. Too often the suckers, recklessly cut down, perish with the trunks to which they are attached ; and the young trees, which very slowly attain to a certain degree of development, fall in their turn beneath the hatchet, never again to appear. The same may also be said of the seeds. A supervision and control exercised over the cutters by means of inspectors, would, to a certain extent, check this vandalism, but, unfortunately, could not practically be carried into operation. The inspection of the woods in our country is a very different thing from inspecting a forest in the New World, especially if this forest cover 20,000 square miles.

In fact, it appears to me that there are but two methods which could be adopted for preventing the rapid destruction of the cinchona trees. One is to limit the exportation to a quantity proportionate to the sustainable produce of the forest ; the other, that of making the trees objects of regular cultivation. To limit the exportation would certainly be

the most efficacious method; but is it not to be feared that the disproportion between the consumption and production is already too great to admit of the balance being thus restored? and moreover, are not our wants too pressing to give way to considerations affecting only the future?*

There remains then cultivation, and this must be resorted to. If there be a tree which is worthy of being acclimated in a French colony, it is, certainly, the cinchona, and posterity will be grateful to those who may succeed in putting this plan into execution.

In a subsequent article we propose noticing the particular notions of M. Weddell on the classification of the cinchonas; to which will be added the description of new species for which science is indebted to the learned researches of this naturalist.—*Pharm. Journ. from Journ. de Pharmacie et de Chemie.*

* In support of this view of the subject we may cite the case of the Company of La Paz, to whom the Bolivian government conceded the monopoly of the commerce of the cinchonas of Bolivia, with the power of annually exporting 4,000 quintals or 40,000 Spanish pounds. The restriction imposed in this case was never observed, and complaints have been made that the quantity allowed to be exported has been greatly exceeded. What would it be, then, if the restriction were entirely removed, as they are in most other parts, and especially in Peru, where the exportation, during some years, has attained to an extent which is almost incredible.

In New Granada, at the time when the commerce of cinchona bark was carried to the greatest extent, that is to say at the commencement of this century, the quantity exported from Carthagena alone amounted in one year, 1806, to the enormous extent of 1,200,000 pounds. In the present day, on the contrary, scarcely any is exported.

ART. VI.—TABLE OF COMMERCIAL CINCHONA BARKS
WITH THE BOTANICAL SPECIES FROM WHICH THEY ARE
BELIEVED TO BE OBTAINED.

I. GREY CINCHONA BARK.

§ I. LOXA CINCHONA BARKS. (Crown Bark *Angl.*—China Loxa, Kron
China *Germ.*)

- | | | |
|--|---|-------------------------------------|
| Loxa Cinchona Bark, grey compact | } | <i>Cinchona Condaminea</i> H. et B. |
| Loxa Cinchona Bark, brown compact,
(<i>Dunkle Ten China</i> <i>Germ.</i> — <i>China</i>
<i>pseudo-Loxa</i> Bergen.) | | <i>C. scrobiculata</i> H. et B. |
| Loxa Cinchona bark, red chestnut.—
Light Calisaya. | | |
| Loxa Cinchona bark, red fibrous of the
King of Spain (<i>Quina astoposa</i> Pav. in
collect. Lamb. Mus. Brit. Loxa Cin-
chona bark, yellow fibrous | | |

§ II. LIMA OR HUANUCO CINCHONA BARKS. (Silver Bark, Grey Bark
Angl.—China-Huanuco, Graue, China *Germ.*)

- | | | |
|--|---|-------------------------------------|
| Lima Cinchona bark, grey brown, (<i>Cas-</i>
<i>carilla provinciana</i> Peruv.) | } | <i>C. micrantha</i> Ruiz et Pav. Gr |
| Lima Cinchona bark, grey ordinary | | <i>C. lanceolata</i> Ruiz et Pav. |
| Lima Cinchona bark, white | | <i>C. purpurea</i> Ruiz et Pav. |
| Lima Cinchona bark, very rugous, re-
sembling the Calisaya bark.— <i>Casca-</i>
<i>rilla negrilla</i> Peruv. (? <i>Cascarilla lagar-</i>
<i>tijada</i> Laubert) | } | <i>C. glandulifera</i> Ruiz et Pav |
| Cinchona bark, red of Jaen and of Loxa ? | | |

II. RED CINCHONA BARKS.

(Red bark *Angl.* Rothe China *Germ.*)

- | | | |
|--|---|-------------------------------|
| Red Cinchona bark, becoming white in
the air | } | <i>C. nitida</i> Ruiz et Pav. |
| Red Cinchona bark of Lima | | |
| Red Cinchona bark true, non-verrucous
(<i>Cascarilla verdadera</i> , Laubert | | |
| Red Cinchona bark, officinal) | | |
| Red Cinchona bark true, verrucous | | |

Orange-red Cinchona bark, verrucous
 Pale-red Cinchona bark with a white
 surface
 Brown Carthagena bark
 Red Carthagena bark

}

III. YELLOW CINCHONA BARKS.

Yellow Cinchona bark of the King of
 Spain (*Cascarilla amarilla del rey*.
 Laubert.)

Calisaya Cinchona bark, or Royal Yel-
 low bark (*Königs China* Germ.—Yel-
 low bark *Angl.*—*China regia* Bergen)

Orange yellow Cinchona bark—Cinna-
 mon Cinchona bark (*quinquina—can-
 nelle*,) light Calisaya (*cascarilla claro-
 amarilla* Laub.)

Pitaya Cinchona bark. (*Quinquina de
 la Colombie ou d'Antioquia* Guib. Hist.
 Nat. des Drog.—*Cascarilla parecida
 à la Calisaya* Laubert.)

Woody Carthagena bark (*Quinquina de
 Colombie ligneux*)

Orange Cinchona bark of Mutis (*Spon-
 gy Carthagena bark; New Spurious*
Yellow Pereira)

HUMALIES CINCHONA BARK. (Rusty Bark *Angl.*—China Humalies,
 Braune China *Germ.*)

Humalies Cinchona bark, dull grey

Humalies Cinchona bark, thin reddish

Humalies Cinchona bark, white

Humalies Cinchona bark, ferruginous

Yellow Cinchona bark of Cuenca

} *C. Calisaya* Wedd} *C. micrantha* Ruiz et Pav.} *C. Condaminea* Humb. et
Bonp.} *C. lancifolia* Mutis.*C. hirsuta* Ruiz et Pav.! *C. purpurea* Ruiz et Pav.

?

C. micrantha Ruiz et Pav.*C. ovalifolia* H. et B.

IV. WHITE CINCHONA BARKS.

Ash-colored Loxa Cinchona bark (*Ash*
bark *Angl.*—*Blasse Ten-China* Germ.
 —*China Jaen* Bergen)

Grey Cinchona bark, pale ditto

White Loxa Cinchona bark

White fibrous Jaen Cinchona bark

Cuzco Cinchona bark

Arica Cinchona bark

} *C. ovata* Ruiz et Pav.} *C. pubescens* Vahl., or} *C. cordifolia* Mutis.

Pale Yellow Carthagena Cinchona bark.	}	<i>C. cordifolia</i> Mutis.
—(<i>Hard Carthagena bark</i> Angl.—		
<i>Quina amarilla</i> Mutis.— <i>China flava</i> <i>dura</i> Bergen.)		
Orange yellow Carthagena Cinchona bark (<i>Quinquina de Maracaibo</i> .— <i>Chi-</i> <i>na flava fibrosa</i> Bergen)	}	?
Pitayon Cinchona bark, or false Pitaya Cinchona bark		

The following, according to M. Guibourt, are the most active barks ;

- | | |
|------------------------------|---|
| 1. Calisaya Cinchona bark | 5. Non-verrucous true red Cinchona bark |
| 2. Yellow orange " | 6. Red Lima " |
| 3. Pitaya " | 7. Grey Lima " |
| 4. Verrucous true red " | 8. Verrucous white Huamalies " |

Pharm. Journ. Weddell, *Hist. Naturelle des Quinquinas*, 1849.

ART. VII.—ON THE PREPARATION OF THE HYPOSULPHITE OF SODA.

BY M. FAGET.

The composition of this salt as met with in commerce is not always the same ; it varies according to the process employed in its production. When it is prepared with the bisulphite of soda and sulphur, the product consists of a large quantity of sulphate and but little hyposulphite.

It is best procured by boiling the neutral sulphite with sulphur. However pure the neutral sulphite may be, the hyposulphite will be mixed with a small quantity of sulphate. M. Pelouze explains the presence of this sulphate by the boiling water in the presence of sulphur and the hyposulphite. I have never however been able to detect the least trace of sulphuretted hydrogen, even on boiling the hyposulphite with sulphur for a long time. I should rather explain the presence of this gas by the simultaneous action of the water and sulphur upon the excess of alkaline

carbonate which is added to the bisulphite to transform it into the neutral sulphite.

The best process for procuring the neutral sulphite consists in dividing a solution of alkaline carbonate into two parts, saturating one with sulphurous acid gas, and afterwards neutralizing it with the second portion of the carbonate. When a solution of carbonate of soda is saturated with sulphurous acid gas, the liquid not only contains all the gas forming the bisulphite, but also that which the water of the liquid retains in solution. Hence when the first portion is neutralized by the second, we do not obtain a neutral solution, but a mixture containing excess of the bisulphite. It is therefore best to introduce the neutralized liquid into a large flask, to boil it alone at first, and not to add the sulphur which is to convert it into hyposulphite until the excess of sulphurous acid has escaped. In following this plan, almost the whole of the soda is converted into the hyposulphite. If requisite, the salt may be purified by recrystallization.

M. Plessy adopts a method of purifying the hyposulphite which is also used with great advantage in the preparation of pure carbonate of soda from the impure commercial crystallized carbonate. The salt is melted in its water of crystallization, and the heat is continued so as to evaporate a portion of the water. When the solution cools, the hyposulphite alone crystallizes, the mother-liquor retaining the impurities. If the hyposulphite does not contain any sulphate, it will not, when dissolved in a large quantity of water, precipitate salts of baryta.

I may mention an easy process for determining the identity of the salt. It is based upon the alteration which it undergoes when heated, and consists in ascertaining the weight of the residue obtained by calcination, and examining if it contains sulphur. From 15 to 30 grs. are introduced into a tube closed at one end. The tube is then carefully heated to drive off the water of crystallization; and when

the salt is completely dried, the heat is increased, and the tube heated throughout its whole length, so as to expel the volatilized sulphur which has condensed upon its internal surface. On calcination, the hyposulphite yields sulphur, sulphurous acid and a residue of sulphuret and sulphate. When the tube has cooled, it is again weighed. If the salt be pure, the residue should amount to about 44·6 per cent. of the salt. The presence of sulphuret in the residue is easily determined by treating it with water, and adding a drop of solution of subacetate of lead; that of sulphuric acid, by a salt of baryta. Of all the oxysalts formed by sulphur, the hyposulphite is the only one which yields sulphur on calcination. The neutral sulphite of soda ($\text{SO}_3, \text{NaO} + 10\text{HO},$) which is inodorous, also yields sulphuret; but on calcination it neither gives sulphur nor sulphurous acid, and the residue which it leaves amounts to 40·5 per cent.—*Ibid. from Journ. de Pharm.*

ART. VIII.—OBSERVATIONS ON CARDAMINE AMARA, HORSE-
RADISH AND MYRONIC ACID.

By F. L. WINCKLER.

The author has examined the dried herb of *Cardamine amara*, which had been collected just before flowering. Its taste was more bitter than acrid. According to his experiments, it contains a sulphuretted and nitrogenous acid, most probably identical or very closely allied to the myronic acid of mustard seed, combined in the plant with an organic substance, and which, both alone as well as in combination with bases, forms with myrosine of yellow mustard seed, but not with emulsine of almonds, an acrid volatile oil resembling the oil of horseradish. Considering the intense bitterness and the slight acidity of the herb, it is not probable that a substance acting the part of the myrosine is present in the herb.

Fresh roots of horseradish, which even on grating disengaged a volatile oil, lost their acidity on being heated for some time in the water-bath under alcohol. The alcohol which distilled over was not acrid, and contained no volatile oil, for it was not rendered turbid by water. The spirituous extract deposited, on distilling off the alcohol, a dirty green fatty mass, which was removed. The remaining filtered aqueous liquid left on evaporation an amorphous brownish-yellow residue. Alcohol of 0.863 spec. grav. dissolved a portion, leaving an insoluble residue of sugar; the solution, on being again evaporated with myrosine from mustard seed, disengaged oil of horseradish, and still contained sugar, for on oxidation there was formed along with sulphuric acid some oxalic acid.

Absolute alcohol removed a substance from this mass without acquiring any perceptible color, and which collected in the form of a powder over the smeary sediment, and was separated by decantation. This latter substance will undoubtedly prove to be highly interesting, and the author promises to furnish a more accurate examination of it. From the experiments hitherto made, it appears to be a combination of sugar with potash, which seems to be combined with myronic acid in the horseradish. In the treatment above described this acid could be detected, by means of myrosine, in the smeary sediment beneath the absolute alcohol after it had been dissolved in water, whilst the alcohol contained no compound of myronic acid, but first took up the compound of sugar and potash and then deposited it, and on the addition of an alcoholic solution of potash deposited still more of the compound in the form of a snowy-white powder; there was still more sugar and potash contained in the smeary sediment. This sugar could not be obtained crystallized after separation from potash by means of sulphuric acid and removing the excess of acid by baryta. The compound of sugar and potash dissolves in hot alcohol when no excess of potash is present, which renders it

brown, without decomposition, and again separates from it as a fine white powder. The isolated sugar dissolves in cold alcohol. To obtain more of this sugar, the author agitated syrup with eight times its quantity of absolute alcohol, decolorized the clear decanted liquid with animal charcoal, and mixed it with a solution of potash in alcohol. In this manner he procured a large amount of this compound of sugar and potash, which possessed all the properties of the substance obtained from the horseradish.

According to the above experiments, myronic acid is most easily prepared by fermenting the residue from the alcoholic extract of the horseradish after distilling off the alcohol in order to destroy the sugar. On evaporating the fermented liquid, a bitter syrup is obtained, which contains acid myronate of potash. No volatile oil is formed in this fermentation.—*Ibid*, from *Journ. für Prakt. Pharm.*

ART. IX.—PHARMACY IN HUNGARY.

The pharmaceutical reform, which has made so much progress in the north of Germany, has not yet extended its beneficial influence into Austria. In this country, the pharmacutists are still almost completely dependent on the medical men, and the latter appear to have been even encouraged by the local authorities in the exercise of arbitrary and despotic conduct, which they have fearlessly indulged in towards the pharmaceutical body. Thanks to the liberty of the press, which was granted in the course of last year, and to the courageous effort of some of our brethren who asserted the rights of the body, the government has put an end to the most flagrant of the acts of injustice to which the pharmacutists were previously exposed. Yet, although the condition of the pharmacutists has been considerably ameliorated of late, much still remains to be

done, especially in those parts of the country where the imperial government cannot sufficiently exercise its vigilance with reference to the numerous abuses which continue to exist.

In Hungary, pharmacy is really in a hopeless condition. One of the principal causes which have contributed and still contribute to lower the pharmaceutical profession, is the existence of too great a number of pharmaceutical establishments. A second cause of the great depression of the state of pharmacy in Hungary is the very small amount of remuneration obtained by its practice. But the latter condition has been an inevitable consequence of the former. We may give the following case by way of example:—

In the circle of Guns, in Eisenberg, the population of which is at most 50,000 there are thirteen pharmacutists, which makes an average of one to every 4000, and in the capital of this circle, a town of about 6000 inhabitants, there are two pharmacutists. Several of these establishments are in a miserable condition, having neither stove, pans, press, or distillatory vessels. They are frequently without some of the most important drugs, and yet they undertake to dispense physicians' prescriptions. At only one of these thirteen establishments is an assistant kept, the proprietors of all the others are completely tied to their shops. The annual receipts of each of these pharmacutists, is, on an average, only 500 florins (about £54;) and it may be said, without exaggeration, that the sale of birds, which in Hungary is practised in connexion with pharmacy, constitutes the principal means of support of the proprietors of these establishments.

Now, how is it possible in such cases, where the shops are in so deplorable a state—where the annual receipts scarcely exceed £54—where the pharmacist does not possess the necessary means of improving his position, and is hardly able with economy to procure animal food for his Sunday's dinner, how, we say, can a scientific character

be maintained? It is not to be wondered at, but, on the contrary, it was natural to expect, that the means which have been adopted on three several occasions for the organization of a system of pharmaceutical instruction, have proved ineffectual. Besides, if, in spite of the evils to which we have alluded, a scientific spirit was yet maintained among the Hungarian pharmacentists, the last vestiges of it would speedily be obliterated through the ignorance and arbitrary acts of those in authority.

Thus, for instance, there resides in one of the capital towns a person appointed as a kind of sanitary commissioner, who, possessing no medical degree, after having served in the campaigns of 1805 to 1809, as medical assistant to the army, arrogated to himself the title of Doctor, and in 1810 was raised to the position he now occupies. This man, not content with enforcing the law in reference to Physicians and Surgeons, intermeddles with the affairs of the pharmacentists over whom he has supervision, and in this capacity his ignorance and his arrogance are often manifested. As is often seen with those who have not regularly studied their profession, this pseudo-doctor changes his system as he would his coat; at one time an allopathist, at another a homœopathist. But there is here hidden a secret motive. Pretending that the pharmacentists are not capable of preparing his prescriptions, and that, therefore, he can place no confidence in them, he asserts the right of dispensing his own homœopathic and allopathic medicines, thus monopolizing the triple function of physician, surgeon, and pharmacist, and yet one of the pharmacentists in whom this commissioner pretends that he can place no confidence, was formerly a legalized pharmacien of Paris, and has laid himself out especially for the preparation of homœopathic medicines.

The superior authorities of the government, in reply to the numerous complaints of the pharmacentists, who have been so shamefully supplanted in the exercise of their art,

have frequently reproved this false doctor, and the magistrate of the town ; but these gentlemen have been content to return the communication, and have carried effrontery to such a point, that the magistrate has not hesitated to declare in public, "although the government may send a thousand orders, we will act as we please." Can such things be credited ?

About the middle of last year, a pharmacist residing in the circle of Guns, presented a petition to the royal government of Hungary, signed by himself and other practitioners of the country, in which the petitioners, in claiming the redress of their grievances, propose at the same time divers measures to be adopted for the amelioration of their profession. This petition produced no effect, a result which may be partly ascribed to the confusion created by political changes. It nevertheless gave rise to the abolition of the practice of visiting the shops of pharmacutists.

The different nationalities which subdivide Hungary still exercise a fatal influence in preventing unity among the pharmacutists. The Magyars and the Germans, respectively, sympathise only with those of their own nation. It is melancholy to see such trifling questions cause dissension among our Hungarian brethren, who, above all things, ought to understand that their welfare depends upon union and concord. They have only to look to the scientific movements which have taken place among the pharmacutists of Germany, Belgium, France, and other European countries, to be convinced of this great truth. Individual efforts will never be productive of important results ; it is only by the combination of the different members of the body that success can be ensured to the just demands for redress.

There can be no doubt that the political dissensions which still remain in Hungary and Austria have contributed in preventing the pharmacutists from obtaining redress for their well-founded complaints. We may hope that in

Hungary, when civil troubles have given place to a beneficial peace, the government will seriously give its attention to the domestic interests of the country, and introduce into the organization of the pharmaceutical body those reforms which are so imperatively called for.—*Journal de Pharmacie d'Anvers and Pharmaceutical Journal for Oct.*

ART. X.—RECENT IMPROVEMENTS IN THE MANUFACTURE
AND REFINING OF SUGAR.

In a brief notice of the meetings of the British Association at Birmingham, in the last number of this Journal, we alluded to a paper read before the Chemical Section by Dr. Scoffern, “On the combined Use of the Basic Acetate of Lead and Sulphurous Acid in the Colonial Manufacture and Refining of Sugar.” This process has been made the subject of a patent; and as it has attracted some attention in this country, while another process, not very dissimilar, has created a degree of sensation among manufacturers on the Continent, we have thought that a description of the proposed improvements may be interesting to some of our readers.

DR. SCOFFERN'S AND MR. SIEVIER'S PATENTS.

Dr. Scoffern's patent is dated December 7th, 1847; and the specification was enrolled on the 7th of June following. The invention relates to the employment of sulphurous acid as an agent for the separation of lead from solutions of sugar which may have been purified thereby.

In refining sugar, according to the patentee's process, the raw sugar is dissolved in a pan, and basic acetate of lead, in the proportion of about forty grains to every pound of sugar, being added, the mixture is kept at a temperature of 180° Fahr. for five minutes; it is then left to repose for about fifteen minutes, when, on examination, a curdy brown precipitate will be seen gradually sinking to the bottom, and

leaving the liquor above in a greater or less degree of transparency. The syrup is now filtered through bags, and is received into copper vessels. It will be found to contain a quantity of lead, for the separation of which sulphurous acid gas is passed through it. The patentee states that the precipitation of the lead by this means is complete. He recommends that, before the use of the gas is suspended, the filtered liquor should be tested for lead with solution of sulphuretted hydrogen, or sulphuret of ammonium. The lead being thus removed, the saccharine liquor will still retain free sulphurous acid and the acetic acid originally in combination with the lead. It is now rapidly heated to 180° Fahr., and chalk or powdered marble added to neutralize the acid. After concentrating it to a proper degree it is either crystallized at once, or further purified with animal charcoal.

In applying the process for the refining of cane-juice, the latter is first neutralized with lime or chalk, and the basic acetate of lead then added in the proportion of 150 grains to the imperial gallon of juice. The subsequent parts of the process are conducted in the same manner as in the case previously alluded to.

The efficacy of basic acetate of lead for the purpose for which it is used in this process cannot be doubted; and if the subsequent removal of the excess of lead from the solution can be completely ensured by the means specified, the process will probably possess some important recommendations, especially in the manufacture of sugar from the juice of the cane or beet root. In the discussion which took place on the subject at the Birmingham meeting, two objections were urged to the process;—first, that although a Chemist, operating in his laboratory, may completely remove lead from its solution by means of sulphurous acid, yet that the workmen employed in the manufacture of sugar would be likely occasionally to be less successful; and secondly, that acetate of lime would necessarily be left in the molasses.

Whatever the merits of this process may be, it appears that there are two patents for the discovery of it. Some months before the date of Dr. Scoffern's patent, Mr. Sievier took out a patent for certain improvements in the manufacture of sugar. This patent was sealed on the 12th of July, 1847, and specified on the 12th of January, 1848. Among other substances proposed to be used for purifying and decolorizing saccharine solutions, is mentioned, diacetate of lead, the excess of which is directed to be removed by passing a stream of sulphurous acid gas through the liquor. This process, and that patented five months afterwards by Dr. Scoffern, are, in fact, identical.

The circumstances of this case have been subject of conversation among scientific men for several months past. We are informed that Mr. Sievier, after taking out his patent, required, as is usual in such cases, the services of a professional Chemist, to perfect the details of the invention before entering them in the specification. A period of six months is allowed by law for this purpose; and in this instance Dr. Scoffern was the Chemist employed, at a salary of about fifteen shillings a-day, for making the necessary experiments, which were conducted at Mr. Sievier's house. The result of this transaction was that the confidential assistant subsequently claimed the most important parts of the process as his own, and proceeded to take out a separate patent for them. We refrain, for the present, from offering an opinion upon the justice of this claim, but believe it will, ere long, be contested in a court of law.

M. MELSEN'S PATENT.

We pass now to notice the other process to which we have already alluded as having excited considerable interest on the Continent. This process is the invention of M. Melsens, a Professor of Chemistry at Brussels. It consists in the use bisulphite of lime, which is added to the juice of the cane or beet-root, for the twofold purpose of preventing fermentation, and of separating, by coagulation, most of the

coloring matter and azotized principles which are always present. M. Melsens states he had found many metallic oxides and salts, especially the diacetate of lead, to be perfectly efficacious in removing those azotized constituents of the juice with which fermentation originates; but he thinks that lead could never be safely introduced into a manufacturing process such as that of sugar. He was, therefore, induced to seek some other agent which might be equally efficacious without possessing the deleterious properties of the salt of lead, and he conceives that he has found such an agent in the bisulphite of lime. The salt is formed, according to Leibig, by saturating an aqueous solution of sulphurous acid with carbonate of lime. It exists only in solution, and M. Melsens uses one the specific gravity of which is 1.075. Of this solution he adds about four parts to one hundred of the juice of the beet-root; and in operating upon the sugar-cane he uses one part of the solution to one hundred parts of cane.

The solution of bisulphite of lime is represented to possess the following valuable properties:—

1st. It is a most effectual antiseptic, preventing the production and action of all ferments.

2d. From its great avidity for oxygen, it counteracts any tendency to oxidation in the juice to which it is added.

3d. It is an excellent clarifying agent, causing the coagulation of all albuminous or coagulable substances when heated to 212° Fahr.

4th. It decolorizes all those coloring matters which pre-exist in the juice of the cane or beet-root.

5th. It prevents the production of coloring matter which would otherwise be formed in the juice in the process of evaporation to which it is submitted.

6th. It affords the means of neutralization for those acids existing naturally in the juice, which are injurious to the sugar, while the sulphurous acid, which in such case would be set free, is almost inert.

Hitherto, in the manufacture of sugar from the cane, a very imperfect system of expression has been adopted, by which not more than one-half, or two-thirds at the most, of the juice is obtained. This portion is obliged to be rapidly evaporated, or fermentation would speedily commence, and much of the sugar is thus destroyed or rendered uncrystallizable. The part left in the cane might be extracted by means of water, but in tropical climates the tendency to fermentation precludes the possibility of recovering the sugar from such dilute solutions. It may be considered, therefore, that not more than one-half of the sugar originally present in the cane is obtained in a good and saleable condition.

M. Melsens recommends an entirely new method of proceeding. The canes, instead of being merely crushed as heretofore, are rasped. About one per cent. of the solution of bisulphite of lime is now added, which prevents any change from taking place. The rasped canes are pressed, and water with a little of the bisulphite of lime is added to the marck, and the pressure repeated once or twice, so as completely to extract the sugar. The liquors thus obtained are, in the next place, heated to the boiling point, when coagulation takes place, and the juice is thus defecated and decolorized. So completely unalterable is the solution said to be while there is any of the bisulphite present, that it is proposed to effect the evaporation spontaneously by the heat of the sun. The whole of the sugar is thus obtained, and nearly all of it in the crystallized state.—*Pharmaceutical Journal for Nov.*

ART. XI.—ON THE FERMENTATION OF THE MALATE OF LIME.

BY PROF. J. LIEBIG.

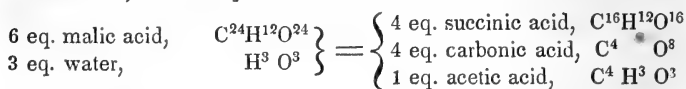
As it is probable that some chemists may have procured during the present season a supply of malate of lime for the preparation of succinic acid, it may be useful to add to the information previously communicated, some further experience respecting the fermentation of the malate of lime.

From the juice of the berries of the mountain ash, which had been neutralized with milk of lime and then mixed with beer-yeast, there separated, after ten days' standing at the ordinary temperature, colorless crystals of pure succinate of lime, several lines in length; they were coated with a fine colored powder, which consisted of carbonate of lime. I have observed, that the amount of succinic acid is greater, the more slowly and quietly the fermentation is conducted. It is, therefore, of importance that the temperature during the fermentation, and the quantity of yeast or putrid cheese which is added, should not exceed a certain limit. 125 cub. centim. of yeast to 1 lb. of dry malate of lime and 6 lbs. of water, proved to be a very good proportion. The disengagement of hydrogen is decidedly injurious; it indicates another process of fermentation, in which no succinic acid is formed, or that which has been formed is destroyed. In one case, in which 19 lbs. malate of lime were fermented with twice the usual quantity of cheese, on the seventh day the fermentation became so violent that the mass overflowed from the great disengagement of gas. Nearly the half of this gas proved to be hydrogen. In this experiment, not more than 1 lb. of succinic acid was obtained from this large quantity of malate of lime.

The disappearance of the acetic acid in this experiment

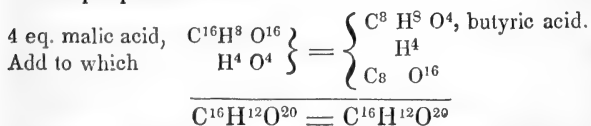
was remarkable ; the mother-ley contained in its stead a quantity of butyric acid. From 24 to 30 oz. of oily butyric acid (which, however, was not free from acetic acid,) were obtained from the mother-liquor. There is at the same time formed another volatile product, of an oily ethereal nature, which is procured by distilling the mother-liquor containing the lime salts ; it is colorless, readily soluble in water, and has a powerful agreeable odor of apples. It is separated from water by carbonate of potash and by chloride of calcium (of which it dissolves a considerable quantity in the anhydrous state.) It is one of the so-called fermentoles, of which several, as first suspected by Berzelius, are probably compounds similar to alcohol or the aldehydes.

The formation of the succinic acid is explained in the following manner:—6 eqs. malic acid take up the elements of 3 eqs. water, and produce 4 eqs. succinic acid, 4 eqs. carbonic acid, and 1 eq. acetic acid :

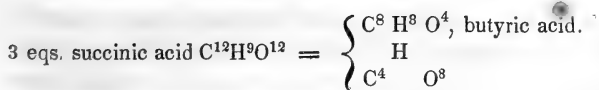


If butyric acid is produced directly from malic acid, there should be disengaged on the whole, carbonic acid and hydrogen in the proportion by volume of 1 : 2 ; but as at least 3 eqs. of the carbonic acid are retained by the lime, the proportion of carbonic acid and hydrogen obtained should be as 10 : 8 or as 5 : 4 vols.

If we imagine butyric acid to be produced from succinic acid, the carbonic acid and hydrogen disengaged should be in the proportion of 2 : 1.



Of the 8 eqs. carbonic acid, 3 are retained by the lime.



Of the 4 eqivs. carbonic acid, 2 eqivs. are retained by the lime.

The following proportions of hydrogen and carbonic acid were obtained at different periods of the fermentation (accompanied by evolution of hydrogen :)—

$$150 \text{ H} : 169 \text{ CO}^2 = 4 : 4\frac{1}{2}$$

$$140 \text{ H} : 140 \text{ CO}^2 = 4 : 4$$

$$108 \text{ H} : 186 \text{ CO}^2 = 4 : 7$$

$$120 \text{ H} : 220 \text{ CO}^2 = 4 : 7\frac{1}{2}$$

$$111 \text{ H} : 221 \text{ CO}^2 = 4 : 8$$

From these relations it may be admitted that the butyric acid is produced both from the malic and the succinic acids, which would explain the decrease in the amount of the latter.

The following analyses of the products of this process of fermentation were made by Mr. Halerow.

The Acetate of Silver furnished—

Carbon,	.	.	14.3	4 =	14.4
Hydrogen,	.	.	1.9	3	1.8
Oxygen,	.	.		3	14.3
Oxide of silver,	.		69.3	1	69.5

The Butyric Acid gave—

Carbon,	.	.	54.1	3 =	54.5
Hydrogen,	.	.	9.2	3	9.1
Oxygen,	.	.		4	36.4

Chem. Gaz. Oct. 1st, from Liebig's Annalen.

ART. XII.—FORMULÆ FOR THE PREPARATION OF
SEALING WAX.

BY F. X. POTTINGER.

Mr. Pottinger, of Triesch, recommends the following formulæ for the preparation of sealing wax:—4 ozs. of Venetian turpentine are melted with 7 ozs. of shell-lac in an earthenware vessel over a slight charcoal fire. Then $2\frac{1}{2}$ ozs. of cinnabar and $1\frac{1}{2}$ drachm of carbonate of magnesia are to be mixed with oil of turpentine into a thick paste; and having previously added to the first mixture $2\frac{1}{2}$ ozs. dry cinnabar, the paste is immediately added; the whole being constantly stirred until bubbles arise, when the mixture is removed from the fire and stirred until the bubbles disappear. The mass is then poured into tin moulds, the interior of which must be greased with oil of almonds. When the sticks are hardened they are polished by being quickly drawn through a charcoal fire or spirit flame.

The following formulæ are warranted.

Fine Red.—4 ozs. Venetian turpentine, 7 ozs. shell-lac, 4 ozs. cinnabar, $1\frac{1}{2}$ drachm magnesia with oil of turpentine.

Fine Red, No. 1.—The same formula, except $3\frac{1}{2}$ ozs. cinnabar instead of 4.

Red, No. 2.—4 ozs. Venetian turpentine, $6\frac{1}{2}$ ozs. shell-lac, $\frac{1}{2}$ oz. colophony, $2\frac{1}{2}$ ozs. cinnabar, $1\frac{1}{2}$ drachm magnesia and oil of turpentine.

Red, No. 3.—4 ozs. Venetian turpentine, 6 ozs. shell-lac $\frac{3}{4}$ oz. colophony, $1\frac{3}{4}$ oz. cinnabar, &c.

Red, No. 4.—Turpentine and shell-lac like No. 3, colophony and cinnabar each $1\frac{1}{2}$ oz., magnesia, &c.

Red, No. 5.—4 ozs. turpentine, $5\frac{1}{2}$ ozs. shell-lac, $1\frac{1}{2}$ oz. colophony, $1\frac{1}{4}$ oz. cinnabar, magnesia, &c.

Fine Black, No. 1.— $4\frac{1}{2}$ ozs. Venetian turpentine, 9 ozs. shell-lac, $\frac{1}{2}$ oz. colophony, lamp black mixed with oil of turpentine as much as is required.

Black, No. 2.—4 ozs. Venitian turpentine, 8 ozs. shell-lac, 3 ozs. colophony, lamp black and oil of turpentine.

Yellow, No. 1.—2 ozs. Venitian turpentine, 4 ozs. shell-lac, $1\frac{1}{4}$ oz. colophony, $\frac{3}{4}$ oz. king's yellow, $1\frac{1}{2}$ drachm magnesia and oil of turpentine.

Dark Brown, No. 1.—4 ozs. Venitian turpentine, $7\frac{1}{2}$ ozs. shell-lac, $1\frac{1}{2}$ oz. brown English earth, (ochre) magnesia, as above.

Brown, No. 2.—4 ozs. Venitian turpentine, 7 ozs. shell-lac, 3 ozs. colophony, $1\frac{1}{2}$ oz. English earth, (ochre) magnesia as above.

Light Brown, No. 1.—4 ozs. Venitian turpentine, $7\frac{1}{2}$ ozs. shell-lac, 1 oz. brown earth, $\frac{1}{2}$ oz. cinnabar, $\frac{1}{2}$ oz. prepared chalk, magnesia as above.

Light Brown, No. 2.—4 ozs. Venitian turpentine, 7 ozs. fine shell-lac, 3 ozs. colophony, $1\frac{1}{2}$ oz. English earth, $\frac{1}{4}$ oz. cinnabar, 1 oz. washed chalk, magnesia as above.

Dark Blue, No. 1.—3 ozs. Venitian turpentine, 7 ozs. fine shell-lac, 1 oz. colophony, 1 oz. mineral blue, magnesia as above.

Green, No. 1.—2 ozs. Venitian turpentine, 4 ozs. shell-lac, $1\frac{1}{4}$ oz. colophony, $\frac{1}{2}$ oz. king's yellow, $\frac{1}{4}$ oz. mountain blue, magnesia as above.

Carmine Red, No. 1.—2 ozs. Venetian turpentine, 4 ozs. shell-lac, 1 oz. colophony, $1\frac{1}{2}$ oz. Chinese red, 1 drachm magnesia, with oil of turpentine.

Gold, No. 1.—4 ozs. Venitian turpentine, 8 ozs. shell-lac, 14 sheets of genuine leaf gold, $\frac{1}{2}$ oz. bronze, $\frac{1}{2}$ oz. magnesia with oil of turpentine.—*Pharmaceutical Journal*, Sept. 1849.

ART. XIII.—THE LABORATORY OF BERZELIUS.

In a very interesting notice which M. Louget has just published on this illustrious Swedish chemist, there is a description of his laboratory by M. Johnson, which will be read with interest :—

The Academy of Sciences, of which Berzelius is the perpetual secretary, and in the buildings of which he has his own laboratory, have lately bought for him a larger and more commodious house, and I arrived precisely at the time when he was occupied in removing to it—a period by no means favorable for my object, as his first laboratory was almost empty, and his new one not yet completely organised. Nevertheless, he offered with much kindness to make a series of experiments with me; a proposition which pleased me greatly, as it gave me an opportunity of observing his manner of operating, and of acquiring many valuable hints. During the course of these operations nothing was overlooked, and he appeared desirous of explaining the most minute details necessary for obtaining precise results, and endeavored to enforce the necessity for these little precautions, of which his experience had taught him the importance in analytical research. “Come,” said he, “while this operation is in progress, I will show you two or three little things which, perhaps, you may not be sorry to know.” And all this took place in the same day, so that I had at the same time the advantage of instruction and of passing my time in the most agreeable manner. Sometimes he showed me mineralogical specimens, amongst which he possessed some of great rarity, or else he related the results obtained by foreign chemists on the subject on which we were occupied; he would then endeavor to make me comprehend some passages which appeared obscure, or would even translate entire passages from an author whose works I could not read. Berzelius used to take private pupils, but for some time back he had relin-

quished the practice. The number of these pupils was very restricted, for throughout Sweden there are but eight or nine who have enjoyed this privilege, and about an equal number in Germany. Nevertheless, he liked to introduce strangers into his laboratory, and was much pleased in showing them the results of his long experience. Although apparently in the enjoyment of good health, he complained of the approach of old age. For the last two or three years his sight had required the aid of spectacles. His memory no longer served him as heretofore, and he was obliged to label all his bottles, which he had previously distinguished without this precaution.

Any stranger wishing to visit Berzelius should go by way of the *Drottning-Gattau*, at the commencement of which stands the church of Adolphus Frederick. The house forming the corner of this street is the large building lately purchased by the Academy. On approaching the house this way, he mounts two little steps which are opposite the door, and may forthwith enter: he need not fear the abruptness of his entrance, as a little bell will announce his arrival. He will discover, by the sight of various utensils arranged about the entrance, that he is in the laboratory of a chemist. If he be neither chemist nor even amateur, and is not frightened by the sight of the chemical apparatus, he will have nothing to fear from the emanations arising from them, which in most laboratories affect so sensibly the organs of respiration. Here they are all carried off by a most efficient system of ventilation, and even if any operation be in progress it may be approached without fear. To the right, adjusted with care near the window, may be seen a mercurial trough, from which the light is brilliantly reflected. Further on is a small porcelain table with raised edges, on which are probably some glass apparatus indicating the progress of certain experiments. After having glanced at the blowpipe, its large lamp, and the objects that surround it, we next arrive at the sand-bath. It is in

vain to search in this laboratory for brick or stone furnaces, which may be useful in operations on the large scale, but are not required in the delicate processes of analysis. The apparatus used by Berzelius consists of a hearth raised about three feet from the ground, and covered with a hood for carrying off vapors. On this hearth is a small sand-bath heated with charcoal, and a small iron furnace with holes for receiving tubes, retorts, &c.

In the second apartment the first object to be remarked is a glass case on a table, containing the balance. How great is the light which this fragile and simple instrument has contributed to the natural sciences! How numerous are the phenomena which it has explained, and the hidden truths which it has revealed! Who can count the discussions which it has terminated,—the hypotheses which it has destroyed? Who could have believed, in past times, that the determination of abstract truths and the development of the laws of nature would be due to the oscillations of this instrument? But examine this balance with attention, for it has rendered great service to science, and the modifications which have been made in it are of importance. The method of raising and maintaining in repose the beam and the pans is due to Gahn, whose skill in such work was well known. There are also small leaden weights, the exact counterpoise of all the crucibles and small platinum vessels of the laboratory, so that each might be readily tared. Around this room are placed in drawers or glass cases divers apparatus and chemical preparations in perfect order; and near the window is a table arranged for blow-pipe operations, on which Berzelius has written an excellent treatise.

We now turn to the left, and perceive, in a third apartment, Berzelius himself, who is probably occupied in writing. His table is covered with journals and borne down with the weight of books. By his side is a small cabinet, in which are contained rare chemical products. It is here

that rhodium, osmium, selenium, &c., are to be found, and he will take pleasure in showing you these and other specimens. Berzelius is constantly occupied. He works from twelve to fourteen hours daily ; but, notwithstanding all he has done for experimental chemistry, it must not be supposed that he works unceasingly in his laboratory. Frequently when composing, he ceases to work in the laboratory for months together. If, while writing, as in the preparation of the last edition of his work on Chemistry, he meets with any passage that appears obscure, he quits his pen, and establishes himself in his laboratory, which he does not quit until he has obtained the desired result. He then returns to his editorial labors.

His apartments are admirably arranged, so as to admit of his passing from his study into his laboratory. It is in his study that he receives his morning visitors. By the side of this apartment is a long room, in which his apparatus is arranged ready for use, so that he can commence any operation without loss of time. It is thus that he has been enabled to lay out his time and make it of double value.—*Pharmaceutical Journal*, October, 1849, from *Répertoire de Pharmacie*.

ART. XIV.—STERLING'S PROCESS OF MAKING AMBER VARNISH.

In manufacturing amber varnish according to Mr. Sterling's method, the amber (which has to be submitted to high temperature to melt it) is introduced into a stout copper vessel, which is closed at top and luted with clay. This vessel is furnished at its lower end with a funnel-shaped vent, which carries a perforated sheet of iron or seive, sufficiently fine to prevent the escape with the melted amber of any impurities which might be contained in the amber.

This vessel is introduced into a large chafing-dish fixed upon a high stand, and its tapering bottom projects through a hole in the bottom of the chafing-dish, and extends a few inches downwards. When the vessel is thus adjusted, the chafing-dish is nearly filled with coal, and lighted. The fuel is, by the peculiar form of the chafing-dish, prevented from dropping into the oil vessel, to be presently described, and thereby soiling the liquid.

The heat from the ignited fuel very soon heats the vessel to such a temperature as will melt the amber and cause it to flow through the perforated metal or sieve above mentioned, in passing through which it will be purified from all extraneous matters. The melted amber runs into a copper vessel which is placed below the chafing-dish, and is provided with a long handle. This vessel or receiver is filled about two-thirds full with the oil from which it is intended to prepare the varnish, and is placed upon an ordinary chafing-dish charged with incandescent fuel, which heats the amber to such a temperature as to cause it to become incorporated with the oil. When this is completely effected, the vessel is cleansed for a fresh operation, and the other ingredients necessary for the manufacture of the varnish are added to the mixture of oil and amber, as soon as it has cooled down to a suitable temperature.

These very simple means present the following important advantages over those now in use for the manufacture of varnishes:

1st. The amber melts completely without any residuum; and as it is contained in a perfectly tight vessel, nothing, or next to nothing, is lost by the evaporation of its constituent parts.

2d. The application of a high temperature effects the fusion with ease and rapidity.

3d. This mode of preparing varnishes is perfectly free from danger as regards fire. The amber is contained in a perfectly close vessel, and cannot, therefore, take fire, espe-

cially as the air has no access through the spout through which the melted amber flows. Neither will the oil through which the melted amber flows be liable to take fire, for it does not require to be heated to a very high temperature, as is at present the practice,—the amber being now melted and dissolved in oil heated to the point of violent ebullition. And further, the chafing dish is small, and it is impossible it can communicate to the vessel filled with oil (which is of much more considerable capacity) sufficient heat to cause fear of fire.

4th. All the vessels are of stout copper, and consequently are not liable to burst, as is the case with the earthen ones, which are at present too often employed.

It will thus be seen, that, independently of the practical advantages which this method of manufacturing varnish (and which has already stood the test of long experience) possesses over those ordinarily in use, it has the important one of being unattended with danger.—*Pharm. Journ.*, Sept., 1849, *from the Technologiste, as translated in the London Journal.*

ART. XV.—MODE OF SILVERING GLASS BY THE EMPLOYMENT OF GUN-COTTON.

M. Vohl has recently discovered that a solution of gun-cotton in a caustic ley possesses in a high degree the property of precipitating silver from its solutions in the metallic form. In fact, on bringing gun-cotton into contact with a caustic ley of sufficient strength, the cotton will become dissolved in the ley, giving out ammonia with a considerable degree of heat, and producing a deep brown liquid, somewhat thick. On pouring an acid into this, a brisk effervescence is produced, carbonic acid and nitrous acid being disengaged.

The action of the gun-cotton in this instance shows that it is not simply dissolved, but undergoes decomposition, by which the atoms of oxygen in the nitric acid enter into combination with the atoms of carbon in the cotton, thus producing carbonic acid, which, as well as the nitrous acid produced by the nitric acid, combines with one part of potash. A fresh decomposition of nitrous salt by the potash, in the presence of hydrogenated substances, furnishes ammonia.

The most remarkable property of this alkaline solution is the following: On pouring into it a few drops of a solution of nitrate of silver, and adding ammonia until the oxide of silver formed is re-dissolved (the mixture being slowly heated in a water-bath,) the liquid will at a certain period assume a deep-brown color and effervesce, the whole of the silver being precipitated on the sides of the vessel. The mirror thus produced is much superior in brilliancy to those produced by means of ethereal oils or ammoniacal aldehyde; and the facility with which it is produced will doubtless render it of practical importance.

This property is not exclusively possessed by gun-cotton; it is found also in cane-sugar, sugar of milk, manna, gums, and other substances which may be rendered explosive by treating them with nitric acid. Nitropicric acid produces under the same circumstances a reflecting metallic surface; and it appears that this reaction takes place with all bodies which, when treated with nitric acid, do not furnish products of oxidation, but another series of bodies, which admit of carbonic acid forming one of their constituent parts.—*Pharmaceutical Journal, from Technologiste, and Newton's Journal.*

ART. XVI.—ON SENNA LEAVES.

BY F. L. BLEY AND F. DIESEL.

Messrs. Bley and Diesel have submitted *Senna obovata*, *S. Alexandrina* and *S. Tinnevelly*, to chemical examination, and obtained the following results: Volatile oil and malic acid could not be discovered in the senna. The leaves of *Cassia lanceolata* and of *C. obovata* left 11 or 12 per cent. of alkaline ashes, in which chloride of potassium, traces of lime, magnesia, and soda, were found mostly combined with carbonic acid, and also phosphoric and silicic acids. Senna leaves also contain a peculiar *yellow resin*, probably the same which Feneulle obtained in the impure state from senna-pods. Messrs. Bley and Diesel call it *Chrysoretin*. The *brown resin* and the *brown extractive matter*, which was called by Lassaigne and Feneulle *Cathartin*, cannot be completely separated from each other. *Pectin*, *gummy extractive matter*, *chlorophylle*, and a small quantity of *fat*, were also found.

Although the authors were not able to isolate the active principle, yet they are of opinion that Alexandrian senna is more active than either the obovate or Tinnevelly senna, because it yields a larger quantity of a spirituous extract, having a superior odor and taste. This property is used as a measure, for spirit of wine also dissolves almost all the constituents which water takes up from the leaves. At the same time, it is observed as a striking circumstance, that the alcoholic extract of half an ounce of senna (which had been perfectly exhausted by spirit of wine) produced only nausea and uneasiness, and could therefore contain but little of the active principle. As regards experiments concerning the efficacy of the individual constituents of senna, we have the following results:—the *chrysoretin*, in doses of from 30 to 45 grs., remained without effect; the *brown resin*, in doses of from 15 to 80 grs., did not operate upon

the bowels, but merely caused nausea, and in larger doses, vomiting. In large doses of 60 grs., it appeared to operate as a diuretic, and could be detected after a short time in the urine, in consequence of the color which it assumes on the addition of potash. The so-called *cathartin*, in doses of two-and-a-half to three drachms, caused only nausea and disagreeable eructation, without operating upon the bowels.

These experiments tend to show, that the individual constituents, extracted by spirit of wine from the senna leaves, as well as their aggregate, do not purge. The authors, however, doubt the statement of Heerlein, that spirit of wine only extracts from the leaves macerated in it inert substances, and none of the active principle. The final result to which they are led by their examinations is, that odor, taste, relation to chemical agents, and medicinal powers of senna, depend chiefly on the co-operation of the extractive matter and the resin, and only in a subordinate degree on the pectin, the pectates, and the other salts of the leaves. No share in the activity can be ascribed to the volatile oil, as no appreciable quantity of it can be procured.—*Pharmaceutical Journal*, from *Pharm. Central Blatt. für* 1849, No. 8.

ART. XVII.—ON OIL OF COPAIVA.

By C. C. MITSCHERLICH.

Mitscherlich has made a number of experiments with the oil of copaiva, and found that the effects of it are similar to, but much milder than, those of the oil of lemon and turpentine. Oil of copaiva is, of all the volatile oils yet examined, the feeblest poison, for though from six drachms to one ounce of it introduced into the stomach of rabbits caused in full-grown rabbits considerable illness it did not produce death. Young animals died within from 11 to 28 hours from one ounce.

The oil of copaiva is absorbed from the stomach. Immediately after death has taken place, it can be detected by the odor in the abdomen, but not in the blood. The urine acquires a strong odor of the oil. The experiments on the odor of the breath cannot be relied on, as, by the introduction of the oil through the mouth, the latter is easily soiled by it, and then acquires the smell of the oil.

The volatile oil of copaiva, moreover, causes a similar change in the organism to that produced by the oils of lemon and turpentine, and juniper. The stomach is neither inflamed nor reddened; in one case small blood discs were perceived in it, in another instance the innermost layer of the glandular coat was softened. The small intestine is so far changed, that its epithelium was removed and converted into mucus. The large intestine was, in one instance, where the oil did not reach it, perfectly normal. In another case, where the oil had reached it, no epithelium was perceived, and one spot was inflamed.

The chief symptoms in cases of poisoning with oil of copaiva are, frequent but not very powerful pulsation of the heart; greatly accelerated respiration; frequent emission of urine, mostly in small quantities; frequent excretions of *fæces*, which are at first shaped, but afterwards pasty, and at last mucous and mixed with blood. Muscular weakness increases; in most cases a diminished sensibility, slow respiration, frequent and very feeble pulsation of the heart, lying on the side, and death without convulsions. It appears that death was produced by the passage of the oil into the blood, and not from the bowels.

Upon the skin of man the effect of the oil of copaiva is much weaker than that of the oils of lemon and turpentine, and weaker than that of the oil of juniper. In one case, where a spot on the back of the hand was moistened for an hour with the oil, no burning was experienced; in another case a very slight burning was felt only at last.

The oils of lemon, turpentine, juniper, and copaiva, agree

in their per-centage composition; the equivalents of carbon and hydrogen being in each as five to four. They greatly resemble one another in their pharmacological effects, but differ materially from the other volatile oils, which have a different composition.

The volatile oil of mustard, caraway, fennel, cinnamon, nutmeg, and bitter almonds, in large doses, excite the vascular system and the respiratory organs. They produce diarrhœa, increase more or less the secretion of urine, and cause death with very similar symptoms.

The volatile oil of savine differs from the foregoing in being a much stronger poison, causing no diarrhœa, and acting more violently on the kidneys.—*Pharmaceutical Journal*, November 1849.

ART. XVIII.—ON THE PRODUCTS OF DISTILLATION OF
LACTIC ACID AND OF THE LACTATE OF COPPER.

BY M. ENGELHARDT.

When a highly concentrated lactic acid is exposed to a temperature of 266° to 284° F., an aqueous, acid, and somewhat empyreumatic liquid distils over very slowly. It is dilute lactic acid. When this temperature has been maintained for a considerable time until no more water passes over, the brownish yellow residue forms the anhydrous lactic acid of Pelouze, $C^{12} H^{10} O^{10}$. If the boiling is facilitated by rough substances, &c., the hydrated lactic acid can be brought into a state of ebullition at 392° , and be distilled without decomposition; but, without this assistance, whilst a portion passes over which increases in amount according to the height of the temperature, the remainder is converted between 356° and 392° into anhydrous acid.

Anhydrous lactic acid dissolves but very sparingly in boiling water, to which it imparts a bitter taste. In the state in which it occurs forming the residue in the retort,

it is a solid, amorphous, brownish yellow mass, which melts even below the boiling point of water, becomes tenacious on cooling so as to be drawn into threads, possesses an excessively bitter taste, and dissolves in every proportion in spirit and in absolute alcohol. From this solution the anhydrous acid is precipitated by water in flakes, which gradually unite into drops. By prolonged boiling with water, or by long standing exposed to a moist atmosphere, the anhydrous acid is reconverted into the ordinary state. This metamorphosis is very quickly effected by treatment with alkalies and alkaline earths. The anhydrous lactic acid may be exposed to a temperature of 464° F. without experiencing any change; decomposition begins at 482° and is complete at 500° . The products of decomposition (at 500°) are carbonic oxide, with about 3 to 4 per cent. in volume of carbonic acid; further, aldehyde, lactic and citraconic acid, with which is mixed some reproduced lactic acid; no hydrocarbons were found among them, nor could any lactone or acetone, stated by Pelouze to occur among these products, be detected. From 1 to 2 per cent. of carbon remained in the retort.

When, in order to separate these substances, the distillate is mixed with water, aldehyde and hydrated lactic acid dissolve, whilst another portion sinks to the bottom as a transparent, yellowish, and at first very mobile oil. When left for some time in contact with water, the amount of the oil gradually decreases, and in the course of a few days it has entirely disappeared, leaving behind a few smeary crystals, which likewise dissolve in the course of time. This results more rapidly when a large quantity of water is added, and the whole well shaken or heated. The oil consists of lactide, citraconic acid, and some hydrated lactic acid. That no anhydrous lactic acid distils over as such is proved from the fact, that when the contents of the first recipient are allowed to solidify, and are then treated with alcohol, which leaves the lactide undissolved, no lactic acid is precipitated by water from the alcoholic solution.

Aldehyde.—When the distillate, either in the state of liquid or as a crystalline paste, is heated in a water bath to 212° , and the new product passed into anhydrous æther kept cold, this subsequently yields, on passing ammonia through it, aldehyde ammonia.

Lactide.—The residue from the preceding treatment, from which the aldehyde has been removed, forms a brownish liquid, which in most cases again solidifies to a crystalline paste, which is thrown upon a filter, washed with cold absolute alcohol, and dried by pressure between bibulous paper. In order to obtain large crystals, it is redissolved in a little boiling absolute alcohol and set aside to cool. What does not crystallize on cooling is lost, from its becoming converted, both by spontaneous evaporation and by heat, into ordinary lactic acid. The crystals appear to belong to the rhombic system, and exhibit great resemblance to those of the protosulphate of iron. Lactide cakes somewhat together at 248° , and can be sublimed, but it proceeds very slowly. At a higher temperature it melts, sublimes more quickly, and furnishes at 500° the same products of decomposition as the anhydrous lactic acid. Lactide also behaves exactly like anhydrous lactic acid towards water, alkalis and alkaline earths. It is reconverted into hydrated acid. It is, however, more soluble in boiling water than the anhydrous lactic acid, and again separates for the greater part on cooling in small needles. It has neither smell nor taste, but very soon acquires, with the assimilation of water, a strongly acid taste. Lactide, dried *in vacuo*, furnished on analysis—

Carbon, . . .	49.87	6	50.00
Hydrogen, . .	5.67	4	5.56
Oxygen, . . .	44.46	4	44.44

Citraconic Acid is produced only in small quantity. The alcohol with which the crystals of lactide were washed, contains this acid and also lactic acid; it is filtered and dis-

tilled ; what passes over at 428° is saturated with carbonate of baryta, when the salt, which is perfectly insoluble in alcohol, falls as a crystalline paste. This is dissolved in boiling water, from which solution the citraconate of baryta separates on cooling in beautiful nacreous laminæ, which are obtained of the largest size when the solution is concentrated until a pellicle forms on the surface. The air-dried salt lost at 212° , 14.82, 14.49, 14.93 and 14.29 per cent, or 5 atoms of water. The salt, dried at 212° , furnished—

Carbon, . . .	22.57	22.80	10	22.61
Hydrogen, . .	1.81	1.93	4	1.51
Oxygen, . . .	18.15	17.40	6	18.09
Baryta, . . .	57.47	57.87	2	57.79

Lactic Acid.—This is left, either in the anhydrous or hydrated state, in the retort, in the preceding distillation of citraconic acid.

In one experiment, in which 19.5 grms. of anhydrous lactic acid were exposed to a temperature of 500° , and which was continued for eight hours, the author obtained 12.2 per cent. aldehyde, 14.9 lactide, and 1 per cent. carbon. Several experiments made at the same temperature furnished approximative results. On raising the temperature above 500° , for instance to 572° and higher, the amount of lactide and lactic acid is diminished and that of the aldehyde increased. As the disengagement of gas is far more violent, the gases must be much more carefully cooled, in order to prove directly the increase of the aldehyde. The lactide formed is for the greater part decomposed into aldehyde and carbonic oxide by this temperature, which is much above that of the point of sublimation. The decomposition of the lactic acid is therefore simply as follows: At first lactide is produced, and this is decomposed at a higher temperature into 2 equivs. carbonic oxide and 1 equiv. aldehyde, $C^4 H^4 O^2 + 2CO = C^6 H^4 O^4$. The presence of carbonic acid and the composition of citraconic acid tend to

show that in the distillation there is also a substance containing more hydrogen formed ; it was, however, found impossible to isolate it.

Lactate of Copper exhibits two stages of decomposition on destructive distillation. In the first period, which is between 392° and 410° F., carbonic acid and aldehyde appear, with a little hydrated lactic acid, the latter probably arising from the crystals retaining some water of crystallization. The retort now contains metallic copper and anhydrous lactic acid, the decomposition of which between 482° and 500° forms the second period. Lactates with strong bases are decomposed in a different manner. The author recommends the dry distillation of lactates with weak bases for the preparation of aldehyde.—*Chemical Gazette*, Sept. 15, 1849, from *Liebig's Annalen*, lxx. p. 241.

ART. XIX.—ON THE ACTION OF CHLOROFORM ON THE SENSITIVE PLANT (MIMOSA PUDICA.)

BY PROFESSOR MARCET OF GENEVA.

When one or two drops of pure chloroform are placed on the top of the common petiole of a leaf of the sensitive plant, this petiole is seen almost immediately to droop, and an instant after the folioles close successively pair by pair, beginning with those which are situated at the extremity of each branch.* At the end of one or two minutes, sometimes more, according as the plant is more or less sensitive, most of the leaves next to the chloroformed leaf and situated beneath it on the same stalk, droop one after another, and their folioles contract, although generally in a less com-

* I previously convinced myself by experiment that a drop of water, placed delicately on a leaf of the sensitive plant, caused no movement.

plete manner than those of the leaf placed in immediate contact with the chloroform. After a rather long time, varying according to the vigor of the plant, the leaves open again by degrees; but on trying to irritate them by the touch, it is seen that they have become nearly insensible to this kind of excitement, and no longer close as before. They thus remain as torpid for some time, and generally do not recover their primitive sensitiveness till after some hours. If, however, when they are in this state of apparent torpidity, they are subjected again to the action of the chloroform, they close again as they did the first time. It is not till after they have been chloroformed several times, that they lose all kind of sensitiveness, at least until the next day; sometimes they even fade completely at the end of too frequent repetitions of the experiment. In all cases the effects observed are the more marked in proportion to the purity of the chloroform employed and the degree of sensitiveness in the plant.

An analogous phenomenon is produced if, instead of placing the drop of chloroform on the base of the petiole, it is laid on the folioles situated at the extremity of a branch, the folioles of this branch immediately begin to close pair by pair, the common petiole droops, lastly the folioles of the other branches close in turn. At the end of two or three minutes, the nearest opposite leaf, and if the plant is vigorous, most of the other leaves situated below on the same stalk, follow their example. When, after some time, the leaves open again, the same want of sensitiveness is manifested as in the preceding case.

A singular feature in this phenomenon is the manner in which the action of the chloroform is propagated from one branch to another, then from one leaf to another, even the liquid disappears by evaporation almost as soon as it is deposited. This action, as we have just seen, appears to be communicated from the leaf to the stalk, following in the latter a descending direction; generally the leaves situated

above the chloroformed leaf are not at all effected. DeCandolle, in making an analogous experiment on a sensitive plant with a drop of nitric or sulphuric acid, remarked on the contrary, that it was the leaves above the leaf touched which closed, without those situated beneath participating in this motion. The observation of our learned countryman is quite naturally explained by attributing to the ascending sap the transport of the corrosive poison, a transport which, in this case, would take place in the direction from below upwards. But how to account for the apparent transmission of the effects of the chloroform in the contrary direction, from above downwards? Might the descending sap more peculiarly have the property of transmitting the narcotic effects of this singular compound from one part of the sensitive plant to the other; or might there exist in this plant some special organ susceptible of being affected by certain vegetable poisons in a manner analogous to the nervous system of animals? Notwithstanding the interesting investigations of Dutrochet and other physiologists, there still prevails too much obscurity on this subject to hazard an opinion. But in any case the fact is singular, and appears to me to merit the attention of persons accustomed to engage in questions of this nature.

Experiments of the same kind, made on the contractility of the sensitive plant with rectified ether, have furnished me results nearly similar to the preceding; with this difference, however, that whilst one drop of chloroform placed on the common petiole of a leaf situated at the extremity of a branch of a sensitive plant suffices to cause most of the other leaves situated beneath on the same branch to close, ether in general produces an effect only on the leaf itself with which it is put in contact. The next leaves have generally appeared to me not effected. I must however add, that my experiments with ether having been made after others, and at a time of year when the sensitiveness of

the plant had already begun to diminish, it is possible that the intensity of the effects produced may have thereby been effected.—*Silliman's Journal from Phil. Mag.*

ART. XX.—EMPLOYMENT OF CASEIN AS AN ENVELOPE
FOR MEDICINES.

BY G. JOZEAU.

In order to disguise the disagreeable odor and flavor of pills, and to increase their durability, M. Joseau recommends their being coated with casein instead of with gelatin.

Take fresh casein free from butter, put it for twenty minutes into boiling water, press it strongly, and then dissolve it in a sufficient quantity of solution of ammonia, so as to form a liquid having the consistence of syrup ; then mix it with sugar (about one-tenth of the weight of the casein,) evaporate the whole to dryness, and rub to powder

In order now to envelop pills with it, a small quantity of the powder is to be dissolved in water, so as to form a thick mucilage, with which the pills are to be moistened. They are then to be covered with the powder. The pills must be coated two or three times, according to the intensity of their odor and flavor. After the last coating of mucilage, they are to be dipped into slightly acidulated water, instead of being covered with powder, and are then to be dried.—*Pharmaceutical Journal, Dec., 1849.*

ART. XXI.—ON THE PRODUCTION OF MANNA.

BY MR. J. STETTNER.

The *Manna ash*, *Fraxinus onus*, in the manna districts of Capace, Cinesi, and Fabarotto, where the best manna is obtained, does not form woods, as is commonly supposed, but is cultivated in separate plantations. These plantations generally present regular squares, hedged in with *Cactus opuntia*. The trees are planted in rows, and are from two to eight inches in diameter, with stems from ten to twenty-five feet high, which from the first shoot are kept smooth and clean. The soil is carefully loosened and freed from weeds. After the eighth year, the trees yield manna, which they continue to do from ten to twelve years, when they are cut down, and young shoots from the roots trained; one root-stalk frequently yields from six to eight new trees and more. For the production of the manna, young and strong shoots are requisite; but they are not tapped till the tree ceases to push forth any more leaves, and the sap consequently collects in the stem. This period is recognized by the cultivators from the appearance of the leaves; sometimes it occurs earlier than at others, and the collection of the manna takes place either at the beginning of July or only in August. Close to the soil cross sections are made in the stem, and in the lowermost sections small leaves are inserted, which conduct the sap into a receptacle formed by a cactus leaf. This is the way the manna *in sortie* is obtained. The incisions are repeated daily in dry weather, and the longer they continue the more manna is obtained. The stems are left uninjured on one side, so that the manna runs down the smooth bark more easily. The next year the uninjured side is cut. The *Manna cannelata* is obtained from the upper incisions, more than forty of which may be counted on one tree. The sap there is not so fat as below, and consequently dries more easily into tubes and

flat pieces. After the manna has been removed from the trees, it has further to be dried upon shelves before being packed in cases. The masses left adhering to the stems after removing the inserted leaves, are scraped off, and constitute the *Manna cannelata in fragmentis*. *Cannelata*, *can. in fragm.* and *Capace* are collected at the same time from one stem—the more *Cannelata* from the younger, and the more *Capace* or *Gerace* from the older part of the stem. In Sicily, the latter is designated *in sortie*, and is probably the most active. Dry and warm weather is essentially requisite for a good harvest.—*Pharm. Journ. for Dec., from Hooker's Journal of Botany.*

ART. XXII.—OBSERVATIONS ON THE BUTTER OF ANTIMONY.

By A. LAROCQUE.

Serullas has shown, in his treatise on the pharmaceutical preparations of antimony, that all these preparations contain arsenic, excepting tartar-emetic and the protochloride of antimony. It must therefore be interesting to pharmacologists to learn how it is that these two combinations are obtained free from arsenic. The author first followed the directions of the French Codex for the preparation of the butter of antimony.

To prepare this compound, sulphuret of antimony containing sulphuret of arsenic is usually employed. As soon as this is treated at a gentle heat with an excess of muriatic acid, sulphuretted hydrogen escapes, and a solution is obtained in which protochloride of antimony and a small quantity of sulphuret of arsenic are contained. This solution furnishes, on evaporation and distillation, the butter of antimony. In this distillation we first observe that muriatic acid with very little protochloride of antimony pass over; as soon as the temperature rises, the retort becomes coated

with an orange-colored precipitate, whilst as yet but little butter of antimony passes over. Soon after this the concussions which previously occurred cease, and the yellow deposit no longer increases. The distillation of the protochloride of antimony now proceeds without further hindrance.

We observe therefore in the preparation of the butter of antimony two phases. During the first, muriatic acid passes over, and as this disappears the sulphuret of arsenic held in solution in the protochloride of antimony by the excess of muriatic acid separates. The distillation of the butter of antimony really takes place only during the second period. When therefore the receiver is changed at the proper time, the preparation is obtained perfectly free from arsenic.

It results from this behavior, that with butter of antimony prepared in the above manner, powder of Algaroth may be obtained perfectly free from arsenic, which is not the case when the chloride of antimony used for this purpose is prepared by treating sulphuret of antimony with nitric acid, and dissolving the oxide produced in muriatic acid.—*Chem. Gaz. Nov. 1st., from Journ de Pharm.*

ART. XXIII.—VEGETABLE INFUSIONS.

M. Donovan says, that infusions of angustura, orange-peel, cloves, cascarilla, catechu, colomba, gentian, quassia, rhubarb, senna, simarouba, valerian, and perhaps others, may be easily made to assume the concentrated form. If these infusions be directed to be prepared four times the strength of those at present in use, then one part mixed with three of water, will give the article required. The liquor of which the infusions are to be made should be a mixture of three parts of water with one spirit of wine. An infusion made in this way will remain unchanged for any

required time, at least a year, and perhaps many years. If an ounce of such an infusion be mixed with three of water, each tablespoonful will contain one-quarter of a drachm of spirit which could not do injury, even though repeated every two hours. It will, perhaps, answer the purpose better to make use of the mixture of spirit and water, for infusing the materials, than to use mere water, and afterwards to add spirit. In the latter method a precipitation of gelatinous flakes, sometimes considerable in quantity, takes place, which very slowly subsides, and constitutes no small portion of the total bulk. In the former method, this inconvenience is in a great measure avoided, although there is a trifling loss of spirit. The residuum in each case should be submitted to the screw press. Such concentrated infusions would in all probability become articles of manufacture with the large druggists and manufacturing chemists; and thus would the apothecary be relieved of a vast deal of unavailing trouble.—*Amer. Journ. Med. Sciences, from Dublin Medical Press, December 20, 1848.*

ART. XXIV.—PATENT GRANTED TO JAMES CASTLEY FOR IMPROVEMENTS IN THE MANUFACTURE OF VARNISHES FROM RESINOUS SUBSTANCES.

The first part of this invention consists in manufacturing a strongly adhesive and perfectly water-repellent varnish from resin spirit and gutta percha.

3 parts by weight of the gutta percha of commerce are put into a pot with 9 parts of crude resin spirit (obtained by the destructive distillation of common resin,) and subjected to a heat of from 120° to 140° F., the mixture being stirred occasionally until the gutta percha is dissolved. The varnish thus produced is suitable for coating coarse fabrics, such as tarpaulins, rick-cloths, &c.: but to obtain a varnish suitable for fine articles, the patentee substitutes for

the crude resin spirit above-mentioned a rectified resin spirit, obtained by passing a current of steam through the crude resin spirit until the condensed product which comes over attains a specific gravity of about 0.870; at which point the process of distillation must be stopped, as all products of a higher specific gravity will be injurious to the quality of the spirit.

The second part of this invention consists in manufacturing a colorless varnish from resin spirit and gum damar, or from resin spirit and gum mastic.

The patentee mixes resin spirit, which has been rectified by steam in the manner above described, with from one-tenth to one-sixth of its weight of sulphuric acid of not less than 1.700 spec. grav., and thoroughly agitates the mixture; then he rectifies the spirit again by a current of steam, when the spirit comes over in a colorless state; after which he dissolves the gum damar or gum mastic in about four times its weight of this purified rectified spirit, with the aid of a gentle heat. An inferior varnish may be obtained by using resin spirit which has undergone only one process of rectification and has not been treated with sulphuric acid.
—*Chemical Gazette, October, 1849.*

ART. XXV.—ON THE NON-EXISTENCE OF CROTONINE.

BY F. WEPPEN.

According to Brandes' directions for the preparation of crotonine, an alcoholic extract is prepared of croton seeds, the greater portion of the alcohol removed by distillation, and the residue boiled with water and magnesia. The precipitate is then exhausted with alcohol, from which, after filtration, the crotonine crystallizes on evaporation.

The crystals so obtained have, it is true, an alkaline

reaction, but cannot be burned completely upon platinum foil and do not neutralize acids. When they are digested with dilute sulphuric acid, a layer of oil separates on the surface, which after sufficient washing dissolves readily in hot alcohol, and communicates to the solution an acid reaction. On cooling, the substance separates from the alcohol partially in a butyraceous state. It dissolves readily in carbonate of soda, and furnishes a soap. The supposed crotonine is consequently nothing more than a magnesia soap with an alkaline reaction.—*Chemical Gazette*, Sept. 15, 1849, from *Liebig's Annalen*, lxx. p. 255.

ART. XXII.—ON A MODE OF RENDERING SUBSTANCES
INCOMBUSTIBLE.

BY ROBERT ANGUS SMITH.

I have often been surprised that, considering the number of materials which will not burn and the small number which do burn, we should be compelled to build houses so liable without constant watchfulness to instantaneous destruction; that we should go also to sea in vessels made of a most combustible substance filled with enormous fires, frequently under the care of ignorant men. I think, therefore, I may be excused when I endeavor to add to a knowledge of the mode of rendering substances incombustible, or the theory of the mode to be sought after, even if the addition which I make be but a very small one.

Silicate of potash has been considered good. It is a soluble glass which was expected to cover the fibre of cloth or wood, and so protect it from heat. This does act to some extent, probably in the same manner as stones do when put into a fire of wood or coal; they take heat but give none, and are also bad conductors. If silicate of potash remained as a glass, it would act also by keeping out the

air ; but this does not seem to be the case, as it falls after a time to a powder.

It struck me that the mode of preventing combustion was not by protecting the wood from the fire merely, as heat must cause combustible gases to rise from wood, whether there be incombustible substances mixed with it or not, and these gases will force their way to the surface where there is no longer any preventive to burning. My object then was to find a substance which would render the wood unfit to burn, and would cause it to give out gases which would not burn ; so that whilst the wood itself was being preserved, except where in contact with the fire, the gases would assist in extinguishing the fire.

I first tried phosphate of magnesia and ammonia, thinking the ammonia given out would be of use in extinguishing the fire ; but this was of no value, as a piece of calico required to be made quite stiff with it before it was rendered incombustible. The calico was prepared by dipping it in a solution of phosphate of magnesia in muriatic acid and then in ammonia. It seemed to me that the earthly salts are of little use for the purpose required, and that the amount of solid matter incapable of evaporation left on the cloth, assists in a very small degree.

Sulphuric acid, however, seemed to present the most promising characteristics of a substance incapable of burning, and of acting so strongly on vegetable substances as to make them incapable of burning. Sulphuric acid itself is a body perfectly burnt, or we may say overburnt, having an atom of oxygen given to it by artificial means, so to speak, which atom is difficult to separate, and therefore not resembling the oxygen of many highly oxydized bodies. It requires a high degree of heat to raise it to vapor ; and the vapor formed is sluggish and heavy, remaining long where formed, and quenching flame wherever it is. It destroys the texture of wood also and other vegetable substances, causing them to give out after a time gases which do not

burn, mixed with some which do burn ; but if there be enough of acid, forming a mixture which does not burn. The wood also cannot be again induced to become combustible until it be heated to redness, so as to remove all the sulphuric acid, leaving only charcoal.

If sulphuric acid then could be introduced into wood just at the time that the fire was going to take place, the fire would cease to take place ; and this we can do easily by saturating the wood with sulphate of ammonia. When there is no fire present there is no sulphuric acid present, as such ; but as soon as the heat rises, ammonia goes off, and sulphuric acid is instantly presented to the wood. The ammonia does not come off quite pure, it is mixed with nitrogen and sulphurous acid ; and this disengagement of gases is of advantage in extinguishing fire ; when the heat rises to 536° , the sulphuric acid is then left to act on the wood in part and to volatilize in part, and that which I have mentioned takes place. The outside of course would first undergo the change, and the inside would be protected by the incombustible outer part ; if the fire continued to act long, the inner layer would undergo a similar change. I imagine, then, the acid acts in a double manner ; it makes the wood refuse to burn, and it puts out fire. As sulphurous acid is given off in this process, the action is also similar in one point of view to that of sulphur, which has long been used for putting out fire in chimneys.

I have no doubt that a house of wood prepared in this manner might have a fire lighted on the wooden floor without danger, burning only on the spot to which the fire was limited. A ship also would be safe, even if the cinders did fall from the grate in stormy weather.

I know that muriate of ammonia has been used, and that it acts very well ; but I think the sulphuric acid is superior, the ammonia being merely to keep it innocent ; and other volatile base might do. I am sorry, however, that this is not perfect ; its solubility in water is a great disadvantage,

as it cannot be applied to cloths to be frequently washed. True, it is so cheap that it might be applied every washing where there are peculiar dangers; but if a person was standing very near the fire, the ammonia would in part be evaporated, and the acid remaining would be enough to injure the fabric. There are, however cases, such as curtains, to which this could not apply, and where it would be valuable.

Sir William Burnet's liquid is chloride of zinc: he uses it for preserving wood and canvass, and also for preventing fire. I am certainly surprised that more use has not been made of it, being as far as I have seen it, so efficient. I believe the manner in which the chloride of zinc acts is very similar to that of sulphuric acid, destroying the organic matter on the approach of heat, and rendering it incombustible. It can be introduced into wood at a specific gravity of 2000, I believe; sulphate of ammonia cannot easily be used above 1200. By heating the solution more may be attained. Sulphate of ammonia is cheap and easily procured and used, not hurting anything with which it may come in contact, and therefore more easily managed in households.

The chloride of zinc is said to unite with the fibre. This cannot be said for the sulphate of ammonia. It would not, however, come from the centre of a beam of wood, even if immersed in water, as the water enters with great difficulty into wood; and the solution itself cannot be introduced without forming a vacuum in the saturated vessel, and so removing all the air from the wood.

The first time I used this solution I found a large quantity of mould formed, and indeed it contains all the elements to increase its growth. The second time the solution was boiled in an iron vessel, and no mould formed on it; on the contrary mould was destroyed by it. The sulphate of ammonia dissolves iron rapidly, and forms a double salt which is deleterious to such growths. I imagined any

other metallic salt would do, and used ordinary chloride of manganese prepared in the laboratory, which killed all such fungi rapidly, and no more have grown after standing eleven months in contact with organic matter.

I believe there are many ways in which this may be used. My wish was to find a substance suited for building fire-proof ships, and I believe this would do; at any rate the ships would be fire-proof, experience could alone tell if any other objection followed. It does not render the wood hard, heavy or brittle.

I believe it would be of the greatest advantage in mills, which now suffer so much from fire, diminishing or rather entirely removing the expense of insurance. It does not hurt colors; so that even colored goods might be dipped when kept long in one place, or when sent in vessels abroad. Possibly some delicate colors may be attacked, but this must be a rare case.

I am more desirous of seeing ships built of an incombustible material, the means of escape at sea being few, and confined to few; and whilst there is any hope of doing it easily, I scarcely think it proper for any one to neglect what information may exist on the subject.—*Silliman's Journal from Phil. Mag.*

ART. XXVII.—ON ATROPINE.

BY DRs. BOUCHARDAT AND STUART COOPER.

The authors recommended the substitution of atropine for belladonna, in order to obviate the uncertainty of the operation of the latter. The dose can be increased from two milligrammes to one centigramme [about $\frac{3}{100}$ ths to $\frac{1.5}{100}$ ths of a grain troy.]

The local pain caused by atropine when endermically applied is only of short duration, and is not accompanied by any bad consequences. Internally, atropine may be given in the following forms:—

1. *Tinctura atropini*.—1 gramme of atropine dissolved in 100 grammes of spirit of wine of 85 per cent.; one drop of this solution contains about half a milligramme of atropine. The dose is ten drops.

2. *Syrupus atropini*.—One decigramme of atropine dissolved in ten grammes of water, acidulated with one drop of muriatic acid, and mixed with 100 grammes of simple syrup. In 100 grammes of this syrup is contained one centigramme of atropine. The dose is twenty grammes.

3. *Pulvis atropini*.—One centigramme of atropine mixed with two grammes of sugar, and divided into twenty equal parts. Each powder contains half a milligramme of atropine. Children of five years old may take it in whooping-cough two or three such powders daily.

4. *Pilulæ atropini*.—Five centigrammes of atropine, mixed with pulv. rad. althææ and a small quantity of honey, may be made into fifty pills, and one or two given for a dose.

5. *Collyrium atropini*.—One decigramme of atropine dissolved in 100 grammes of distilled water. *Collyrium atropini fortius* is prepared with five centigrammes of atropine and twenty grammes of distilled water. For dilat-

ing the pupil, one or two drops are to be introduced into the eye.

Bouchardat recommends the following method of preparing atropine. The atropine is to be precipitated by a watery solution of iodine in iodide of potassium, and the ioduretted hydriodate of atropine decomposed by zinc and water. The metallic oxide is separated by means of carbonate of potash, and the alkaloid dissolved in alcohol.

Rabbits are scarcely affected by atropine. Dogs are soon poisoned by it. On man the effect is much stronger. One centigramme is able to produce the following symptoms: At first, acceleration of the pulse by eight to twenty strokes; after thirty to fifty minutes, an affection of the brain is produced. The first and most constant symptom is dry throat, with difficulty of swallowing. The second is dilatation of pupils, with increased power of vision, also giddiness, noise in the ears, hallucination, delirium, stranguary, with incapacity of emitting the urine; a sensation of formication in the arms, rigidity of the thighs, depression of the pulse. The unfavorable symptoms disappear after twelve to twenty hours. The sanatory effect of the atropine has chiefly been substantiated in chorea and other chronic nervous diseases.—*Pharmaceuticcl Journal for November.*

MINUTES OF THE PHILADELPHIA COLLEGE OF PHARMACY.

At an Adjourned Meeting of the Philadelphia College of Pharmacy, held 11th month 5th, 1849. Present 21 members.

DANIEL B. SMITH, President, in the Chair.

The objects of the meeting having been stated, the minutes which refer to them were read.

The Committee to whom was referred the proposition to alter Section 2d of Law 5th of the By-Laws of the College, respectfully report the following amendment of the proposition referred to them, viz., To substitute for Section 2d of Law 5th, the following:

SEC. 2. Any Graduate of Pharmacy, producing [the diploma of a respectable College of Pharmacy, and conforming in his professional conduct to the Code of Ethics adopted by this College, may be elected a Resident Member by the Board of Trustees, in the manner prescribed by the By-Laws of that Board.

Any applicant for Resident Membership, conforming to the Code of Ethics adopted by this College, who has served a regular apprenticeship to the drug and apothecary business, but is not a graduate of Pharmacy, shall be examined in reference to his professional qualifications by a committee of examination to be appointed annually by the Board of Trustees, and if his examination is satisfactory, he shall in like manner be eligible to election by the Board.

Also, to substitute for Section 4th of Law 5th, as follows:

SEC. 4th. Professional or scientific men, residing at a distance from Philadelphia, may be elected Associate Members, by the Board of Trustees, provided they are graduates of a respectable College of Pharmacy. Those who are not graduates of Pharmacy, if recommended by the Board as suitable candidates, may be elected Associate Members by the College, at any of its meetings, by the unanimous vote

of the members present. Each member, so elected, to pay a contribution of twenty dollars, in lieu of all other contributions.

We recommend the adoption of these alterations on the ground that their enactment would prevent the admission of unqualified persons into membership in the College, which, under the present rules, that designate no method of ascertaining the professional qualifications of applicants, might at times occur, and which should be avoided as well for the credit of the Institution, as in justice to its qualified members and graduates.

The Certificate of Membership is, in fact, a Diploma, certifying to the confidence of the College in the professional knowledge and skill of those to whom it is granted, and it is often a question with members, whether they can honestly vote to bestow it upon applicants, of whose fitness to receive it they have no means of judging.

Your Committee know no better means of ascertaining the professional qualifications of applicants for Resident Membership, than is designated in the amended section now recommended for adoption, and believe that few qualified persons, desiring to become members, would object to a preliminary examination on these points before a committee; while the knowledge that no members, not graduates, were admitted who had not passed such examination, would add to the value of a membership in the College, as well as tend to increase the number of students and graduates in the school of Pharmacy.

It has been thought advisable to leave the appointment of the examining committee, and the affixing of a standard of examination to the discretion of the Board of Trustees, providing only that that committee should be a stated one, to be appointed annually; as a committee thus appointed, without reference to any individual applicant, would be free from any suspicion of prejudice or partiality, which might

attach to a committee appointed specially to examine a particular candidate.

The alteration of Section 4th will be rendered necessary, if the amendment of Sec. 2d is adopted, because the present section refers to Sec. 2d as it now stands. The changes we have proposed in this section are, that candidates for associate membership, who are graduates, may be elected by the Board without reference to the College, and that the recommendation of the Board, and the unanimous vote of the members present of the College, shall be required for the election of such as are not graduates.

AMBROSE SMITH,
CHARLES ELLIS,
THOMAS P. JAMES
WILLIAM PROCTER, Jr.,
JOHN H. ECKY.

Philada., 11th mo. 5, 1849.

Committee.

The presentation of this report produced considerable discussion, which, on motion, resulted in the adoption of Section 2d, as proposed by the Committee, in place of Section 2d, Law 5th, of the By-Laws of the College.

The proposed substitute for Section 4th of Law 5th, was deferred for the further consideration of our next Stated meeting.

The final report of the Committee on the Revision of the Pharmacopœia was read, and after some discussion upon several important amendments which they proposed, it was accepted, and the committee was discharged. The formulæ for the preparation of Hydrargyrum cum creta and Unguentum hydrargyri nitratis, were, on motion, referred to a special committee, consisting of Wm. Procter, Jr., Edward Parrish, and Ambrose Smith, with instructions to report at the next meeting.

An Essay on Unguentum Tabaci, by Wm. J. Allinson, of Burlington, N. J., was read, and on motion referred to the committee just appointed.

Some remarks were made on the subject of Acidum Nitricum by several members, and another member gave the results of his experience in the use of lard oil as a substitute for other oils in the preparation of ointments, both of which were, on motion, referred to the same committee, with instructions to report.

The Committee on the Pharmacopœia were charged by a resolution of Ninth month, to bring forward names of delegates to the Pharmacopœia Convention, to be held next year. They accordingly produced six names for the consideration of the College. Tellers were appointed, and the College proceeded to the election of three members; Daniel B. Smith, Charles Ellis, and Wm. Procter, Jr., having received a majority of votes, were declared duly elected as delegates to represent us in the Convention to be held in Washington.

On motion, it was

Resolved, That the delegates just appointed have power to fill vacancies in their body.

And the College adjourned.

DILLWYN PARRISH, Secretary.

Editorial Department.

REGISTER.—About a year ago the Philadelphia College of Pharmacy, in view of the difficulties often experienced by members of the College in obtaining assistants or apprentices, and by these in obtaining situations, determined to establish a Register under the superintendence of the Secretary of the Board of Trustees, whereby, applicants, by recording their names, residences, and such hints of qualifications as they deemed proper, would have their wishes forwarded.

It must be evident that such a record, by exhibiting to employers the names and qualifications of a number of applicants, is a great advantage, inasmuch as, to a certain extent, they can select from the list before seeing the party.

Another advantage, incidental to the Register, is, that the Registrar takes the trouble to mention to each applicant the terms of apprenticeship recognized by the College, and other information bearing on his object.

The principal class of applicants consists of those who have had from six months to two or three years experience, and are, therefore, expecting salaries. The great number of such that are to be met with is a serious evil, indicating a disposition on the part of the young men to avoid that preparatory education, so imperatively necessary in our profession to qualify its votaries for their duties.

The Registrar has very properly discouraged those seeking places from any such short terms of apprenticeship, and has held up the importance of a regular and systematic study of the business, including attendance at the school of Pharmacy, which is now considered a condition of apprenticeship of members of the college.

All persons entering their names for apprenticeship are understood to desire a term of at least four years, with the intention of becoming Graduates of Pharmacy.

The Register is kept at the store of the Registrar, EDWARD PARRISH, N. W. corner of Chesnut and 9th streets, to whom applicants for situations may apply without expense.

GENERAL INDEX TO THE AMERICAN JOURNAL OF PHARMACY.—In view of the extensive and valuable information embraced by the American

Journal of Pharmacy, exhibiting as it does, a fair exposé of the discoveries and improvements in Pharmacy, Chemistry, and the collateral sciences, which have occurred during the twenty-one years of its existence, the Publishing Committee have for some time past entertained the idea of collating and publishing a general index to the work, which will greatly facilitate reference to the many valuable papers which embellish its pages, and which are often overlooked by essay writers on similar subjects, from the impediments offered by the necessity of referring to 21 indexes. During the past year Alfred B. Taylor, our worthy Inspector of Drugs, having felt this inconvenience in the investigations incident to his official duties, engaged himself in the preparation of a general index for his own convenience, and the Committee have embraced his liberal offer of preparing the index for the press. It is presumed that the work will extend to 60 octavo pages, and it is proposed to publish it gratuitously to subscribers in three parts, to be issued with the April, July, and October numbers of the Journal. It is presumed that after the issue of the last part, those receiving it, will have them bound together for preservation, in a separate volume, or with one of the volumes of the Journal.

MEMBERSHIP IN THE PHILADELPHIA COLLEGE OF PHARMACY.—By reference to the minutes of the College at page 90 our readers will observe that a very important change has occurred in the conditions required by the By-laws of the Institution; of those who apply for membership. Heretofore the applicant had only to be recommended by three members of the College to the Board, be of good moral character, and engaged in business, to be eligible. No examination was made of his qualifications, if not a graduate, and on election he received the following certificate: "The Philadelphia College of Pharmacy, instituted to promote and encourage a knowledge of that science, and to guard against abuses in the preparation and sale of medicines, reposing confidence in the *knowledge, skill, and integrity* of A—— B——, have associated him as a resident member thereof," &c. It must be apparent that the language of this certificate is almost as strong as that of the diploma given to graduates, and expressed in reference to an individual engaged in business, will have more influence with the public at large than the latter. The injustice of this to those young men whose laudable ambition has led them to acquire or seek the diploma, is too glaring to need explanation, and the fact has been one cause of avoiding the trouble of graduation by a number of the students of our School.

The present law requires that the qualifications of the applicant be investigated by a committee of examiners, who shall report to the Board, and whose favorable opinion shall be necessary to his election by that body. It will be seen by reference to the law at page 90 that this committee is appointed annually, and without reference to any particular applicant, being in fact the same committee who are empowered to act with the professors in examining the pupils of the school of Pharmacy; hence there can be no invidious feeling on their part against any of the applicants who may come forward.

We hope that the passage of this law may prove an additional stimulus to our students, to make sure of the diploma, which is, in fact, admission to membership also, when the graduate desires.

NATIONAL CONVENTION FOR THE REVISION OF THE PHARMACOPEIA.—

The call for this convention to meet in the City of Washington on the first Monday in May 1850, has been made by the proper authority, and we would call attention to the importance of an early appointment of delegates by the several bodies who have a right to representation. These bodies are "the several incorporated State medical societies, the incorporated Medical Colleges, the incorporated Colleges of Physicians and Surgeons, and the incorporated colleges of Pharmacy throughout the United States." The names of the delegates appointed are to be sent to Dr. G. B. Wood, Philadelphia, Vice President of the last Convention. We hope that speedy action in the matter will be taken by the societies, &c., interested.

In a letter just received from Charles A. Smith, Pharmaceutist, of Cincinnati, we are informed that a Pharmaceutical Association has been formed in that city. We are much pleased to hear this indication that our Western friends are awake to the cause of pharmaceutical reform, which, we understand, is much needed in that section. "The Western Lancet" will be their organ for the present, and we shall rejoice to see its pages teem with valuable papers owing their origin to this movement.

Mr. Smith has also communicated the following plan for detecting stearic and margaric acids, (and spermaceti) in sulphate of quinine, by means of chloroform. Six grains of the suspected salt are agitated in a test tube with a fluid drachm of chloroform for two minutes, the sulphate of quinine is then dissolved out by dilute sulphuric acid, the solution separated from the chloroform, which is then washed with distilled water, and suffered to evaporate gradually on a piece of paper. The fatty matter, if present to the extent of ten per cent. will be found on the paper, whilst the paper itself will have a greasy stain on it.

THE
AMERICAN JOURNAL OF PHARMACY.

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APRIL, 1850.  
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ART. XXVIII.—CALISAYA BARK.

Translated and arranged by J. CARSON, M. D.

(*With a Wood-Cut.*)

In the last number of the Journal, a general account was published of the labors of Dr. Weddell, in South America. He has been, as there stated, eminently successful in clearing up many doubtful points connected with the subject of Quinology. From the extent and importance of his memoir, he has taken rank in scientific discovery with Ruiz and Pavon, Mutis, De La Condamine, &c. From the same work, on the present occasion, we shall extract the account of the source of Calisaya bark, the discovery of which alone, would have immortalized his name.

Cinchona Calisaya.

C. foliis oblongis, vel lanceolato-obovatis, obtusis, basi attenuatis, rarius utrinque acutis, glabratis, nitidis vel subtus pubescentibus, in axillis venarum scrobiculatis, filamentis quam dimidia anthera plerumque brevioribus; capsula ovata; flores longitudine vix æquante; seminibus margine crebre fimbriato denticulatis.

a. *Calisaya vera*, arbor, foliis oblongo-vel lanceolato-obovatis, obtusis.

β . *Josephiana*, frutex, foliis oblongo-vel ovato lanceolatis, acutiusculis.

Cinchona Calisaya, Wedd. Ann. Sc. Nat. x. 6.

Hab. Bolivia et Peruvia australis (v. v.)



CALISAYA VERA.—A tall tree, with a naked trunk, either straight or bent in its ascent, not infrequently exceeding

twice the thickness of the human body. The head is leafy, mostly elevated above the other trees of the woods.

Bark of the trunk thick. The periderm thicker than in almost all the species of the genus, easily separated from the liber, and when torn off, disclosing marks or impressions corresponding with those of the exterior, as the bark is marked by parallel vertical clefts, or transverse fissures more or less annular. It is whitish, or may be black. The periderm of the branches is whitened, or diversely marbled with the fronds of lichens; it is marked with clefts more sinuate, and fissures which are narrower, some of them are annular and distant, while others are shorter and nearer to each other. Finally, upon the branches, the bark is thin, smooth, and brownish-olive, or blackish.

The leaves are lanceolate-obovate, about 8 to 15 centimetres (3 to 5 inches, nearly) long, and 3 to 6 cm. (1 to 2 inches) broad; they are acute at base, gently attenuate, soft, flat, very glabrous above, beautified with a velvety gloss connected with the prominent cells of the epidermis, and pale green; the veins being pale and little conspicuous; on the under surface they are light emerald green, smooth and scrobiculated in the axils of the veins; the depressions are scarcely perceptible on the upper surface. The *petiole* is 1 cm. (nearly $\frac{1}{2}$ inch) long, green, more rarely rubescent, as is the rib. Upon the young tree, the leaves are often a little more acute, of a more lively green, very velvety, the rib and petiole roseate, the nerves above being milk white, and the limb very often beset with roseo-sanguineous spots, the lower part of the pagina being more or less purpurecent.

Stipules oblong, obtuse, longer than or sub-equal to the petioles, very glabrous, sparingly beset on the inner base with glands.

Flowering panicle ovate, or sub-corymbose, scarcely multiflowered, peduncles and pedicles (2 to 4 millimetres) ($\frac{2}{3}$ to $1\frac{1}{4}$ inches) long, pubescent. Bracts lanceolate.

Calyx pubescent, limb crateriform, teeth short, triangular.

Corolla 9 to 10 mm. ($\frac{1}{2}$ inch) long, tube cylindrical, or at base subpentagonal and slightly contracted, sometimes cleft in the angles, flesh colored, with lanceolate teeth, above rose colored, with white marginal villi. Stamina hidden in the middle of the tube: filaments smooth, half as long as the anthers. *Style* almost as long as the tube, lobes of the stigma linear, subexserted, virescent.

Fruit bearing panicle somewhat loose, not unfrequently very bare, peduncles puberulent.

Capsule ovate, 10 to 15 mm. ($\frac{1}{2}$ to $\frac{3}{4}$ inch) long, the length scarcely double its width, rotund at base, ribbed, smooth, rubiginous at maturity; teeth of the crown short, somewhat erect.

Seeds, elliptico-lanceolate; denticulate, margin fimbriated, teeth approximated, a little obtuse; the nucleus about equal to the third part of the seed.

Habitat.—In the declivities and rugged portions of the mountains, at an altitude of 1500 to 1800 m., and in the woods of the hottest vallies of Bolivia and southern Peru, between 13° and 16° 30' S. L., and 68° and 72° West Long. in the provinces of Bolivia, called Enquisivi, Yungas, Larecacha and Caupolican, and in the Peruvian province Carabaya. It flowers in April and May.

The bark is commonly called indiscriminately by the Spaniards and Indians *Cascarilla Colisaya*, *Calisaya* or *Culisaya*.

The varieties consist in the bark and leaves being more delicate, in the panicle being sub-diffused, and in the flowers being smaller, (vulg. *Calisaya blanca*.)

β. Josephiana.* A shrub, 2 to 3 m. (6 to 9 ft.) high. *Trunk* graceful, 3 to 5 cm. (1 to 1½ in.) thick and branched, branches erect. *Bark* closely adhering to the wood, on the trunk and branches shistous, black, somewhat smooth, or beset with diverse lichens, having some narrow distant clefts, annularly marked; that of the branches brownish red.

* *Kinakina humilis* with oblong leaves, red on the nerves, larger flower, resembling that of *Menianthidis*; the bark still bitter.

Leaves oblong or ovate lanceolate, each subacute, or a little obtuse, slightly rigid; the upper, especially, more or less concave, boat-shaped, glabrous, or on the under side pubescent tomentose, prettily green, both nerves and petioles sanguineous. The *panicle*, both flower and fruit bearing, interrupted. *Corolla* a little longer than in the preceding variety. *Stamina* at the bottom of the tube, filaments either shorter as in the *Calisaya vera*, the style at the same time being longer, or the anthers being long are subexserted, the style is shorter and surmounted by them. The *capsule*, as in the type, somewhat longer than the flower, and not unfrequently more or less attenuated above, towards maturity, beautifully rubescent as well as the branches of the panicle. Teeth of the crown a little elongated and beautifully patent.

It more frequently occurs in mountain meadows of the same regions than the preceding, and, I may say, is the sole kind peculiarly an ornament to them.

It is to this species that we owe the most important of the barks employed therapeutically, known as *Calisaya*, the origin of which has hitherto been unknown.

The etymology of the term *Calisaya* is obscure. Humboldt thought that it came from the province from which the bark was principally derived, but persons well informed with respect to the country, informed me that no such province existed. In the department of La Paz, moreover, it was found abundantly, and frequently went by the name of *Colisaya*, or of *Calisaya*, and I am disposed to believe that these designations have been applied to it in consequence of the red color assumed on drying the external surface of the denuded bark, or of that which the leaves sometimes have. *Colli*, signifies in effect *red* in the Quichua language; and *saya*, taken figuratively, means *sort* or *form*. The red maize is called *Colliscara* or *Culli*.

I have stated that this tree, so far, has not been met with in Peru, except in the southern part of the province of Carabaya; the results at which I have arrived, in searching to

determine with exactness the limits of the region, are of sufficient interest to be noticed here.* Thus after having studied it in the whole ancient province of Yungas de la Paz, to the north of 17° of S. L., I followed it in that of Larecaya or Sorata, then in that of Caupolican or Apolobamba, the place of its first discovery. But having arrived in Peru, I saw it suddenly cease upon the confines of the valley of Sandia; and in spite of all the care I took, I could not find it to the north of these points. There was there a fictitious barrier which the plant did not pass, although in appearance, the neighboring valleys were of the same nature; a fact which can hardly be explained, except upon the supposition that the more southern valleys of the province of Carabaya were different from the northern ones, in consequence of the peculiar distribution of the rivers. I believe, indeed, that I may state that those of the district indicated, belong to a particular group, dependent on the Bolivian conformation, and that those of the remainder of the province diverged on the contrary by the north from Peru, into the upper Amazon. This inexplicable attachment which certain plants exhibit for regions natural to them, and especially for valleys, is not without example; and now that geographical botany has attracted serious attention, science will be more enriched by analogous facts. The great repute of Calisaya bark has caused it to be so sought for, that it is becoming scarce, and there is no doubt but that some day it will completely disappear from commerce, and we shall be forced to be satisfied with some of the species now rejected. Already around inhabited places, it is not seen but as a shrub, and if by chance some small tree remains

* There exists between the Bolivians and Peruvians, a sort of rivalry upon the subject of this production. The rumor having spread, in fact, that *Cinchona calisaya* was not produced except in the Bolivian territory, the barks collected in Peru, no matter how good, are constantly valued at a lower price, of which the Peruvians, with reason, complain.

unnoticed in the forest, no sooner does its trunk elevate itself, but the hatchet attacks it. When, for my satisfaction, I desired to see this species in all its vigor, it was necessary for me to make long journeys afoot into the forests; to traverse them by paths scarcely opened, and to undergo some of the fatigues which constitute the common lot of the Cascarilleros.

The curious variety which I have described under the name of *Cinchona Josephiana*, to commemorate the name, too little known, of Joseph de Jussieu, is called by the inhabitants of the country *Ichu Cascarilla*, or *Cascarilla del Pajonal*, denominations which signify both "Cinchona of the Meadows," (*ichu* in the Quichua language, and *paja*, in Spanish, signify *herb.*) I, for a long time, thought that this variety ought to constitute a distinct species, but further study made in the localities, has proved to me that it is only a particular form of the type to which I have referred it. I have even little doubt at present that the districts it occupies were formerly covered with forests, and that when these were destroyed, doubtless from the effects of fire, the plant in reproducing itself assumed this stunted growth, similar in this respect to many plants in Brazil, which take such different proportions in the *campos* and in the forests. It is probable, from this, that the culture of the cinchona will not succeed, except so far as the conditions are applied to it which will enable it to expand itself. It is especially necessary, it would seem, that it should have the company of other trees, which, by increasing a little more rapidly than it, afford a protecting shade during the early years of its existence.* It has more than once happened to me, upon the mountains of Tepoani, for example, in passing from a pajonal or meadow, to open woods, and from thence

* The soil in which the *C. calisaya* generally grows, is similar to that called *fresh earth* (virgin earth.) It is true, considerable quantities of Humus are formed upon the surface, but they are, in a measure, removed by the rains, which wash the slopes of the mountains, during many months of the year.

to a dense forest, to observe the diverse modifications which the form and the appearance of the *Ichu Cascarilla* undergo. The color and texture of its different parts, especially, undergo the most notable change, according to the degree of exposure in which it grows. In one place the leaves are coriaceous and matted with strongly colored nerves, and with stiff petioles; in another the leaves are soft, and of the velvety green peculiar to calisaya, the petioles being flabby. Finally, when the head of the adult plant peers above the neighboring trees, its organs resume some of the characters which it possesses in the state of *Ichu Cascarilla*.

The characters by which the presence of *C. calisaya* is recognised in the midst of the forest are very variable, and many of them require that species of instinctive skill which is found only among the people who have observed them all their lives. There is not a practised *Cascarillero* who does not pretend to be able to distinguish the top of one of these trees at the distance of a kilometre, by the movement of its leaves and the peculiar reflection which results from it; this recognition is easier still, if the tree be in flower or fruit, the color of which are characteristic. In the forest, the trunk is recognised at first sight by the appearance of the peridermis, sometimes of a grayish white, at others brown or black, but constantly marked by clefts or fissures, longitudinal and approximated, connected by others which are transverse; a character which is not observed in any other tree of these forests, with the exception of one or two of its congeners, and, to a certain degree, the *Vichullo*,* with which it is sometimes confounded. This appearance is frequently, however, concealed by mosses and other parasites, which cover more or less the greater portion of the trunk, and then the oldest *Cascarilleros* may be deceived. I was told that a collector of cinchona bark had had his own tent placed against the large trunk of

*A new species of the genus *Laplacea*, (*Ternstræmiaceæ*;) the *L. quinoderma*; see Weddell, p. 9—33.

a cinchona calisaya tree for a long time without knowing it, until a more skilful person recognised it and appropriated the spoil.

At the moment of the separation of the periderm, both of the surfaces exposed have a yellow color like the fresh peel of the walnut, soon becoming brown like the shell of the same.

The odor is then like that of elder bark, but less decided. The taste is strongly bitter, with hardly an admixture of astringency, but at the same time somewhat sharp; this bitterness is perceived at the first touch of the tongue.

From the external surface of the bark, especially when it has been contused, there flows a yellow gum resinous matter, sometimes a little lactaceous, bitter and styptic, to which the cutters attribute all the virtues of cinchona. This matter is the same as that which fills all the cells of the dermis, and which flows from breaks in the young bark. It has appeared to me, however, contrary to the opinion of the Cascarilleros that it was much less bitter than the juice of the inner face of the bark. It stains the clothes dull red, and its presence more or less influences the color of the bark in drying. The Cascarilleros are of opinion that the abundance of *milk*, as it is called, greater as it is in the *C. calisaya*, retards its desiccation. It is by the effect of bruising that the juice is spread over the surface of the separated bark; the contused points are then seen of a wine color, which is deeper the more they are exposed to the solar rays. I have sometimes seen the Cascarilleros irritate the entire surface with a hard brush to make it assume this shade.

The consistence of this bark, when removed from the tree, is slight; it then breaks any way with the greatest facility. A good idea of this is conveyed by comparing it to the fleshy portion of a mushroom. The Cascarilleros highly value this character, which is more decided where the bark is best. In the inferior qualities, and in the false cinchonas more especially, where the union of the cortical

fibres is more apparent, the bark breaks transversely with greater difficulty.

Dr. Weddell has given descriptions of the two varieties of Calisaya bark, in all respects according with those in the modern works on Pharmacology. Guibourt in his description has been very precise on this point, and has been closely followed. The two are *quills* and *flat* pieces. These constitute the variety called in Bolivia *Colisaya amarilla*, *C. dorada* or *C. anaranjada*. "Another, remarkable for the deep shade of its external face, which sometimes is entirely of a wine black, goes by the name of *Colisaya zamba*, *C. negra* or *C. macha*. I have especially noticed it at Apolobamba in Bolivia, and in the province of Carabaya in Peru."

A third variety, finally, with the surface less unequal, sometimes semicellulose and of a pale color, has merited the appellation of *Colisaya blanca*.

The bark of the *Cinchona Josephiana* or *Ichu Cascarilla* of the Peruvians is rare in commerce, although in indigenous medicine as much used as the other, in consequence of the facility of procuring it. "Its peridermis is brown, or of a blackish gray, or slate color, (a color which, I may remark in passing, appears to me to be common to all the barks of the cinchonas developed under the influence of the air and sun,) upon which are beautifully formed the pale lichens covering it. As this bark is very adherent to the wood, it is but imperfectly detached, and its internal surface is often torn."

I have seen in Peru a sort of cinchona furnished by this same *Ichu Cascarilla*, not from the trunk or branches, but from the large roots, or rather the stump; and it is not improbable that this kind will one day or other be of great importance, in spite of difficulties in procuring it, for not only does it present a mine which so far has been hardly worked, but it would appear to furnish a product superior to much of the bark which engages attention at the pre-

sent day. This bark is in short pieces, flat, undulated, or more or less contorted, destitute of periderm, with a fibrous, even, shining internal surface, slightly cellular externally, of a uniform, ochreous, yellow color, of marked bitterness, but less powerful than in good calisaya, of which additionally it exhibits the internal structural characters.

The increasing scarcity of the calisaya bark has induced the collectors to mix the bark of other kinds with it, and this fraud is more difficult of detection, from becoming habituated to it, or at least from the want of skill required to detect it. The admixture is practised with the bark of the *C. Boliviana* and *C. ovata* var. *rufinervis*, or more rarely, and upon the coast, solely with that of *C. Scrobiculata*; in other words, with the barks which M. Guibourt calls *Calisayas légers du commerce*. With the *C. scrobiculata* it cannot be a long time confounded—but nothing is more easy than with the two first—so that in Bolivia the *Cinchona Boliviana* is also called calisaya, a designation which moreover its properties have well merited. The best characters to distinguish the true calisaya from all other species are—the shortness of the fibres of the entire transverse fracture, and the ease with which they are broken, instead of bending and remaining adherent, as observed in the bark derived from the *rufinervis* and *scrobiculata*. Finally, its uniform yellow color and not white marbling in its thickness, distinguish it from the *C. Boliviana*. The density (which causes the nail to leave a shining mark when drawn over its internal surface forcibly) and the conchoidal form of the outer surface, still further serve to distinguish the calisaya. It is more difficult to discriminate between the quills of the different varieties—the greater thickness of the epiderms and size of the resinous circle, together with the bitterness, will serve, in some measure, to distinguish it.

An idea of the consumption of this bark can be given by the fact that the Bolivian Company export annually, exclusive of sophistication, more than 4000 quintals, or

200,000 killogrammes. It will be difficult for the forests to sustain for a long time so great a demand. The amount furnished by a single tree varies much. A good size tree affords 6 or 7 arobes* after the bark is dried.

ART. XXIX.—PHARMACEUTICAL NOTICES.

BY WILLIAM PROCTER, JR.

Fluid Extract of Sarsaparilla.—It has been frequently objected, in the use of the Compound Syrup of Sarsaparilla, that the large amount of sugar present soon cloyes the patient and creates disgust for the medicine. In view of this, as well as to give a concentrated preparation more manageable than the syrup, the fluid extract, originally suggested by William Hodgson, Jr., (Vol. II. p. 285 of this Journal,) was proposed, and has gradually found its way into extensive use. There are some patients who even object to the saccharine portion of this last mentioned preparation, and I have been called on to prepare it without the sugar.

By reference to the investigations that have been made respecting the active principle of sarsaparilla, it will be found that that substance is but sparingly soluble in water *per se*, and that this fluid is not well fitted, at any temperature at which it may be applied, as an extracting menstruum. Further, it will be seen, when a hydro-alcoholic solution of sarsaparilla is evaporated to a small bulk, so as to remove *all* the alcohol and a part of the water, that there is a tendency in the sarsaparillin to separate by crystallization, by long standing.

Now, in view of these facts, as well as to render this preparation less obnoxious to change by fermentation, it is suggested to replace the whole or a part of the sugar, by alcohol, in such a manner that the alcohol shall not be in

*The arobe equals $11\frac{1}{2}$ killogrammes.

greater ratio than it exists in weak wine. As this is not yet an officinal preparation, I will suggest the propriety of making an addition to its ingredients, founded on an experience of many years, by those who have employed the modified preparation; these are chimaphila and dulcamara, each in the ratio of one part to four of the sarsaparilla. The following is the formula, with the above proposed changes, viz.:

Take of Sarsaparilla, *ground*, sixteen ounces, (troy.)

Bitter sweet and Pipsissewa, in coarse powder,
of each four ounces.

Liquorice root and Guaiacum wood, in coarse
powder, of each two ounces.

Sugar, four ounces.

Alcohol, two fluid ounces.

Diluted alcohol, seven pints.

Water, a sufficient quantity.

Oil of wintergreen and oil of sassafras, of each
four minims.

Mix the solid ingredients—pour over them in a suitable vessel five pints of diluted alcohol—allow them to macerate for one week, and remove the whole to a displacement apparatus, in such a manner that the fluid shall not pass too rapidly. Return the tincture several times, then displace the absorbed portion first with the remaining two pints of diluted alcohol, and afterwards with water, very gradually added, until eight pints of fluid have passed. Recover the alcohol by distillation to one-half, then by means of a water bath evaporate the residue to twelve fluid ounces, and add the sugar, and the two fluid ounces of alcohol in which the volatile oils have been dissolved; let the mixture stand with occasional agitation for four hours, and strain.

It will be perceived that the mezereum has been omitted. The reasons for this are, that it gives an unpleasant acrimony to the preparation, masks the taste of the sarsaparilla, and does not possess any decided virtues in the opinion of

many practitioners. The dose of this preparation is a teaspoonful taken in any convenient vehicle.

Fluid Extract of Rhubarb.—It has been objected to the formula for this preparation, published in Vol. 19, p. 182 of this Journal, that owing to the large proportion of matter extracted, the addition of eight ounces of sugar gives too thick a consistence to the fluid extract, rendering it inconvenient for dispensing and administering in cold weather. The writer has not found this objection so forcible as some others have, but he will propose the following modification of the published formula, which he believes will overcome the objections stated, at the same time that the rhubarb strength of the preparation will not be interfered with. It consists in substituting one fluid ounce of tincture of ginger for two ounces of the sugar, thus:

Take of Rhubarb, eight ounces, (troy.)

Sugar in powder, two ounces.

Diluted alcohol, two pints.

Tincture of ginger, one fluid ounce.

Reduce the rhubarb to coarse powder, mix it with its bulk of sand, moisten with diluted alcohol, and after the drug has become swollen by maceration for an hour, remove it to a suitable displacer, and add diluted alcohol slowly until two pints of tincture have passed. Evaporate this in a water bath to six fluid ounces, add the sugar and finally the tincture of ginger.

The increased proportion of ginger will supersede the necessity of adding the volatile oils. If tincture of ginger is objected to, alcohol will accomplish the end equally well.

Wine of Tar, Tar Beer.—A formula for this preparation was published in the 14th volume of this Journal, (p. 281,) by the late Augustine Duhamel, in which a quart of bran, a pint of tar, half a pint of honey and three quarts of water, are mixed together in an earthen pipkin, allowed

to simmer over a slow fire for three hours, then suffered to cool, half a pint of yeast added, and after it has stood thirty-six hours strained for use.

If these directions are followed to the letter, the product is exceedingly unsatisfactory, will not keep well, and is impregnated with but a small amount of the medicinal virtues of the tar. The addition of the tar at the first part of the process is the chief objection to this formula, for the following reason. It is well known that creasote and other empyreumatic substances will suspend the process of fermentation, when added during its progress, and prevent it from occurring if added with the ferment. Now there is more than enough of this substance in the tar to prevent the action of the yeast almost entirely; hence the product when finished consists of the soluble matter of bran, honey and water, impregnated with so much of the soluble portion of tar as will be taken up under the circumstances in which it is placed, being in fact but little stronger than tar water. The office of the bran is to disintegrate the tar so that the water may act on a largely exposed surface. Ground malt answers this mechanical purpose equally well, and as it is acted on by ferment when placed in water, this is an additional reason why it should be preferred to the bran.

When, therefore, malt is substituted for bran, and the mixture of malt, honey, water and yeast, is suffered to react for thirty-six hours before adding the tar, so much alcohol is generated that it enables the fluid to dissolve a much larger proportion of that substance, and to keep perfectly well. The following is the proposed formula, viz.:

Take of Ground Malt, Honey and Tar, of each one pound.

Yeast, of each, half a pint.

Water, a sufficient quantity.

Mix the malt, honey and three quarts of the water in an earthen vessel, keep them at the temperature of 150° F., (about,) with occasional stirring for three hours, then suffer the whole to cool to about 80° F. and add the yeast. Fer-

mentation soon sets in, and should be promoted by maintaining the temperature between 70° and 80° F., during thirty-six hours. The supernatant fluid should then be decanted from the dregs of the malt, and the tar added gradually to these, in a small stream, stirring constantly, so as to distribute it uniformly among them and prevent its conglomerating in masses. The decanted fluid is then returned to the vessel, and the whole well stirred up from time to time for several days or a week, observing to add water occasionally to keep the original measure. The whole is then thrown on a piece of canton flannel, or other close strainer, the fluid allowed to pass, and the dregs expressed strongly, to remove as much as possible of the fluid enclosed. The expressed liquid is then filtered for use: there is an advantage in allowing it to stand, until it gets nearly clear by subsidence, before filtering it.

When first made, before filtering, wine of tar has but little color, but soon acquires a reddish-brown hue by exposure. It smells and tastes strongly of tar, is slightly acid, is not unpleasant to most persons, and when prepared as above, is undoubtedly a valuable auxiliary to the physician in pulmonary diseases.

Solution of Citrate of Magnesia.—As this preparation has found favor with physicians and the public, and as it is of some importance to be able to prepare it speedily and without much complication, the following recipe is offered as more practicable than that noticed at Vol. XX, p. 254 of this Journal. The formula is for six bottles, and by multiplying the quantities, any desirable amount may be prepared; but as the solution has a strong tendency to deposit basic citrate of magnesia, the number mentioned will be sufficient for most retail establishments at one time.

First prepare six twelve ounce bottles, and fit to them corks of the best quality.

Take of Citric acid, six ounces.

Carbonate of magnesia, four ounces.

Lemon syrup, twelve fluid ounces.

Water, a sufficient quantity.

Dissolve the citric acid in two pints of the water, previously heated; add to it three ounces and a half of the carbonate, and as soon as it is dissolved, strain or filter the solution as the case may demand; distribute it equally between the six bottles, and add to each two fluid ounces of lemon syrup. The remaining half ounce of carbonate is then triturated smoothly with sufficient water to make six fluid ounces, and a fluid ounce of the mixture added to each bottle, which should then be filled with water, immediately corked, and tied over securely. In the course of half an hour, with occasional agitation, the carbonate will be dissolved, and the eliminated carbonic acid retained by the solution, if the corks prove good.

ART. XXX.—ON HYDRARGYRUM CUM CRETA CHANGED
BY OXIDATION.

BY WILLIAM PROCTER, JR.

Within a few years past a number of instances have been noticed in this city, and I believe in Baltimore also, where the administration of this mercurial preparation has produced unlooked for effects, not at all attributable to its acknowledged constituents. My attention was called to this fact more especially by observing a change in the appearance of a specimen of the preparation in my possession, and which I had carefully prepared by the formula of Dr. David Stewart of Baltimore, as modified by the late Peter Lehman, (*Amer. Journ. Pharm.* vol. 16, page 9,) from pure materials. In this specimen which is about 18 months old, the lower undisturbed portion of the powder, immediately

in contact with the glass, had the proper bluish color, characteristic of the preparation, whilst the upper disturbed portion, and indeed the whole mass excepting the part alluded to had a light reddish tinge, such as would be produced by incorporating a small portion of burnt umber with white lead. The idea at once occurred that some unknown circumstances had caused the per oxidation of the mercury, and should this be true, the inordinate effects of the preparation noticed above, would be satisfactorily accounted for. That this supposition was correct let the following investigation witness, viz.

1st. One hundred grains of the specimen of mercury with chalk was placed in a vial, an excess of aqueous hydrocyanic acid added, and the mixture shaken occasionally for ten hours. The whole was then thrown on a filter, the undissolved portion lixiviated and the clear filtrate evaporated in a capsule, until evidences of crystallization were manifest around the edges of the liquid, when the vessel was set aside. In half an hour the mother liquid was decanted from a mass of brilliant acicular crystals, weighing, with that contained in the mother liquid, subsequently isolated, more than 26 grains. These crystals were colorless, had a strong metallic taste like corrosive sublimate, and when dissolved in dilute muriatic acid the odor of hydrocyanic acid was observable. Several grains of these crystals were placed in a sealed tube, the open end drawn out to a fine open point and the closed end containing the saline matter heated to redness, whilst a lighted taper was held at the orifice. Soon a jet of purple flame was seen issuing from the tube, whilst the interior surface of the tube beyond the heated end was coated with globules of mercury, thus completing the chain of evidence that the crystalline matter is bicianuret of mercury, which could only have been formed by deutoxide of mercury in the hydrarg. cum creta.

2. Sixty grains of the cretaceous mercurial powder was boiled in distilled water acidulated with muriatic acid until

all the matter soluble in that menstruum was removed, when the whole was thrown on a weighed filter and the insoluble residue washed with distilled water and dried. The presence of bichloride of mercury in the colorless filtered solution was indicated by its affording a black precipitate with hydrosulphuret of ammonia, a yellow precipitate with solution of potassa, a scarlet precipitate with iodide of potassium soluble in an excess of the precipitant, and a white precipitate with ammonia. The whole of the liquid was precipitated with the latter reagent and the precipitate when washed and dried, weighed 16 grains, representing 17.02 grains of corrosive sublimate in the solution, or 13.68 grains of red oxide in the hydrarg. cum creta experimented on.

The insoluble residue left by the dilute hydrochloric acid weighed 11.5 grains. It had a bluish gray color without exhibiting any globules of free mercury. This was boiled in solution of potassa, which instantly changed its color to black. This liquid filtered off from the black powder was saturated with nitric acid and a slight excess of nitrate of silver added, which produced a white precipitate soluble in ammonia. This was collected on a weighed filter, washed, dried, and weighed, amounting to 1.75 grains, representing .431 grain of chlorine, or 2.9 grains of calomel which was produced from 2.526 grains of black oxide of mercury existing in the mercurial powder analysed. The black powder resulting in the last experiment was treated with acetic acid until the black oxide of mercury was removed, and the filter washed and dried. The residue of metallic mercury partially revived, weighed 6.50 grains.

It follows from these results that the specimen of "mercury with chalk" examined, contains of

	<i>per cent.</i>	<i>equal to</i>
Deutoxide of Mercury,	22.80	21.25 of metal
Protoxide of Mercury,	4.21	4.05 "
Metallic Mercury,	10.83	10.83 "
		<hr/> 36.13

Theoretically, the powder should have contained 37.5 per cent of mercury. The deficit of 1.37 per cent must be attributed to loss in the preparation of the powder originally, and inaccuracy in the analysis.

It is a matter of speculation what should have caused this change in the preparation. The powder was prepared by triturating 6 drachms of resin (colophony) and 3 oz. of mercury, together with sufficient alcohol added from time to time to keep the mixture of a pasty consistence, until the mercury was extinguished properly. Five ounces of prepared chalk was then gradually added, (the consistence being kept pasty) until the whole was thoroughly mixed. The resin was then removed by washing with alcohol—allowing the powder to subside, and decanting, several times renewed and finally lixiviated on a filter with the same fluid until the alcohol that passed ceased to communicate opalescence to water. Can the resinous acid (colopholic acid) of the rosin possess the property of inducing oxidation? and does this agent, by enabling the operator to push the division of the mercury to a very high degree, rendering the powder extremely porous, so extend its surface as to give it a tendency to absorb and concentrate oxygen from the air in its interstices, as is the case with platina sponge, and iron by hydrogen? In the several preparations in which mercury exists in a minute state of division, various suggestions have been made with a view of saving labor, especially in making mercurial ointment. These suggestions are of two kinds—those which act chemically and those whose influence may be considered mechanical. Sulphur, oil of egg, and balsam of sulphur belong to the first class; and when used their action is due to the formation of an exceedingly minute coating of sulphuret of mercury on the surface of the globules, which when divided are thereby prevented from coalescing. Rancid fatty matter, and resins, both of which possess this power of facilitating the extinguishment of mercury in an eminent degree, I have heretofore looked upon

as acting mechanically by their ability to cling to or stain the bright surfaces of the globules of mercury, and thus prevent their coalescence when once divided. Now, on reflection, I am inclined to believe that these substances may act by slightly oxidizing as well as staining the minute particles of mercury, and commence a process which is subsequently carried on by the oxygen of the air. In the case of *blue mass*, the sugar is well known to act as a preventive of oxidation, and hence that preparation ought to be less liable to change by atmospheric exposure than the others. Whatever may be the cause of this extraordinary change, the above results lead us to reject the use of resin, as in the process of Stewart, or any other labor-saving agent having the same tendency, and I think it may be worthy of investigation, whether a mixture of pure chalk and mercury, in which the latter is in a state of extreme division, will not gradually absorb oxygen and have its properties changed. The ordinary glass stoppered bottles, such as the specimen analysed was kept in, will not exclude the air, and if they did the frequent opening in the process of dispensing will afford abundant opportunity for the production of this change, if it really will occur unassisted by any foreign substance.

ART. XXXI.—REMARKS ON SOME OF THE PHARMACEUTICAL PREPARATIONS.

BY JOSEPH LAIDLEY.

(Extracted from an Inaugural Essay.)

Glycerin Ointment as a substitute for Ceratum Cetacei.
Spermaceti cerate having a proneness to become rancid, and unfit for the objects of its employment, and being too stiff, Mr. Laidley proposes the following ointment as a substitute, viz: Take of

White Wax and Spermaceti,	each one ounce and a half.
Lard,	five ounces.
Glycerin,	one fluid ounce.

Melt together the wax and spermaceti, add the lard, and as soon as the whole is liquified, remove the mixture from the source of heat; stir constantly until when on cooling they begin to thicken, add the glycerin and incorporate it thoroughly with the other ingredients.

Samples of the above ointment were tried by two of our most respectable physicians, who gave it a decided preference over the officinal simple cerate. They thought it much more efficacious, milder, of a better consistence, and altogether better adapted to the purposes for which simple cerate is used, than that cerate.

With regard to the glycerin, its healing properties are too well known to need comment; but it should be stated that it acts also as a preservative agent, for an ointment, made as above, except that oil of almonds was used instead of lard, was sweet after having been kept at a moderate temperature during seven months.

Rose Water Ointment. This ointment, popularly known as *Cold Cream*, is a very nice looking article, and when freshly prepared, is undoubtedly a very good one; but it does not keep well; the consistence being soft, and the rose

water renders it rancid, and is liable to separate from the grease.

I would recommend the following formula as affording an ointment which is not liable to such changes if properly prepared, viz :

Take of Oil of Sweet Almonds	two fluid ounces,
Spermaceti,	six drachms,
Glycerin, (sp. gr. 1.15,)	four fluid drachms,
Oil of Roses,	two drops.
Oil of Bergamot,	“

The spermaceti is melted with the aid of a gentle heat. The oil is next stirred in so gradually as not to recongeal any of the spermaceti. The mixture is then removed from the fire and stirred constantly until on cooling it begins to thicken, when the glycerin is thoroughly incorporated. Lastly, add the oil, and mix them.

This ointment, intended as a substitute for cold cream, was originally prepared for some friends, who liked it so much, that after more than two years' use among them, I furnished samples of it to some of our physicians, who preferred it to the Ung. Aqua Rosæ for irritated chapped surfaces. If made with good materials, it will keep for several months, even when subjected to the exposure that ointments usually have in the shop. The glycerin does not ordinarily separate like the rose water.

Nitrate of Mercury or Citrine Ointment. This Ointment, when prepared according to the officinal directions, is a dark brown substance. in consistence usually not much firmer than honey, a fact that has induced many pharmacutists to resort to other methods, in hope of obtaining a handsomer article. The consequence of this state of things is that the preparation varies in composition, consistence and appearance ; sometimes containing mercury as proto-nitrate sometimes as per nitrate.

With a view of satisfying myself that an ointment of nitrate of mercury uniform in composition, in color, and in

consistence *could be made* from the ingredients and proportions indicated in the United States Pharmacopœia, a series of experiments were undertaken. As these number about thirty, it is unnecessary to give a detailed account of them; general results only will be stated.

1st. The Pharmacopœial formula, where the ointment is prepared by melting together the lard and neats-foot oil, and when they begin to stiffen on cooling, mixing in the solution of nitrate of mercury, &c., does not produce a fine preparation; its consistence is too soft; its color is a dark brown, and the proper reaction between the fat and the acid does not take place.

2d. Heat is necessary to induce this reaction, and consequently to the formation of a good ointment; but if carried too high, the excessive oxidation of the fatty matter occurs at the expense of the acid of the mercurial salt, separating a portion of this as insoluble sub-nitrate.

3d. A particular limit should therefore be observed in the temperature at the period of adding the mercurial solution, and this temperature is 204° F. The following formula is suggested, viz:

Take of Mercury an ounce (Troy,)

Nitric Acid (sp. gr. 1.5) eleven fluid drachms,

Fresh neat foot oil, nine fluid ounces,

Lard three ounces.

Dissolve the mercury in the acid, allow the solution to stand until all the nitrous fumes shall have escaped, and the solution becomes colorless, (this may be effected by the aid of heat, if it is wished to proceed with the preparation without delay.) The lard and oil are then melted together, and as soon as the temperature rises to 190° F., add the cold solution, and continue the heat till the temperature of 190° F. is again reached, remove the vessel from the water bath for fifteen minutes, taking care to prevent the temperature from rising above this point; then heat again to 204°, and

finally remove it to a cold water bath and stir constantly until when on cooling it begins to thicken.

[The author regrets that this formula is so troublesome, but he conceives the manipulation stated to be quite necessary to the production of a handsome ointment. He is not certain that the entire removal of the deutoxide of nitrogen from the mercurial solution is essential to the process, but inclines to believe that it is. He further states that on the addition of the cold mercurial solution, the temperature falls to 165° F., and that if the heat is continued much above 190° at first, the re-action will be so violent as to cause the ointment to run over the vessel, unless this is very large: the resulting ointment being dark coloured and granular.—ED.]

Pills of Copaiba. This preparation is sometimes difficult to obtain in a "pilular mass." In following the directions of the Pharmacopœia, the mixture of copaiba with one sixteenth of its weight of magnesia, after standing a whole day, remained semi-fluid; it was then stood aside for a month without acquiring a thicker consistence. In order to satisfy myself of the conditions necessary to the success of the operation, a series of experiments was undertaken, the results of a few of which were as follows, viz:

1st. A portion of copaiba of the consistence of syrup, (the same kind as that used above,) was heated till ebullition commenced, when it was removed from the fire, and the magnesia, one sixteenth of its weight, yet warm from recent calcination, was stirred in; after several hours it had become a good deal harder than the first lot, although not of a consistence proper for forming into pills, and at the end of two days its firmness had not increased. It was then re-heated, another portion of freshly calcined magnesia, equal to the first was stirred in, and at the expiration of four hours the mixture had concreted into a good pilular mass.

2d. A portion of very old and thick copaiba was heated till ebullition commenced, when one eighth of its weight of hot recently calcined magnesia was stirred into it. It solid-

ified in three hours. These experiments were repeated with the same results, from which it would seem that for complete success the magnesia should be calcined immediately before using it for this purpose, and the copaiba heated till ebullition commences. To prevent accident from the boiling over of the copaiba, on the addition of the magnesia, the vessel should be removed from the fire.

3d. As these last experiments were made with very old and thick copaiba, in order to satisfy myself whether a fresh article would answer, several varieties of copaiba were treated as in the second experiment, but using only the prescribed quantity of magnesia. They would not solidify until the second addition of magnesia, which caused them to assume a solid consistence in from five to seven hours.

4th. A portion of *Augustura copaiba*, known as "Solidifying Balsam," was heated until ebullition commenced, when one sixteenth of its weight of freshly prepared and still hot magnesia was added and thoroughly stirred into it. At the expiration of six hours the mixture had acquired a good pilular consistence. On cutting open the mass, I found some of the magnesia uncombined. It should have been stirred occasionally whilst cooling.

From the above experiment I conclude, firstly, that when it can be obtained, *Augustura copaiba* (supposing that its composition, &c., is always the same) should be preferred for this purpose; and secondly, if any other variety than the *Augustura* be employed, one eighth of its weight of magnesia will be necessary to insure solidification.

Dover's Powder, Powder of Ipecacuanha, and Opium. For the preparation of this valuable medicine, the *Pharmacopœia* directs the dry ingredients to be rubbed into a very fine powder. It is generally admitted that the efficacy of this preparation depends in a great measure on the fineness of the powder, and with a view of reducing the opium and ipecacuanha to the finest condition, the sulphate of potassa is introduced; but we seldom meet with *Dover's powder* in

that finely divided condition best calculated to produce its peculiar effects. This arises partly from the length of time necessary, and the amount of labour requisite in the production of a very fine powder; and partly, sometimes, from the disagreeable effects produced on those engaged in its preparation, being such as to induce them to shorten the process of trituration, and of course an inferior powder is obtained.

With a view of remedying these difficulties in its preparation, I have adopted the following manipulation, viz :

Take of Ipecacuanha in powder, a drachm,

Opium in powder, “

Sulphate of Potassa, one ounce

Alcohol (8.35°) a sufficient quantity.

Mix the powders and sulphate of potassa, and when a coarse powder is produced, add sufficient alcohol to form a paste, and then levigate in a large flat mortar until the particles of the pasty mass become impalpable ; allow it to become nearly dry, then triturate until quite dry ; lastly, sift the powder. By this process the labor is much lessened and although the time intervening between the commencement and the end of the process, may be as long as in the method of the Pharmacopœia, yet the time necessarily occupied with it is not near so much. Alcohol is employed in preference to water on account of its greater volatility and its incapability of *dissolving* the sulphate of potassa.

ART. XXXII.—ON GLYCERIN.

BY SAMUEL E. SHINN.

(An Inaugural Essay.)

Although glycerin has for a considerable time been known to the chemist, its application, either in medicine or pharmacy, has been very limited until quite a recent period. It had indeed been occasionally employed to give softness to pills or ointments, and had also enjoyed some reputation, as an emollient application to the skin. But within a short period, it has attracted much attention, on account of its efficacy in cases where deafness has been caused by the induration of the wax of the ear; and it is an admirable remedy, as it does not thicken by oxidation, but rather absorbs water from the air, and has a tendency to keep the parts to which it is applied, continually moist. This disposition was shown, by placing a drop of glycerin upon a smooth surface, and exposing it to the air; it gradually increased in bulk, its consistence became much thinner, and remained so as long as any observation was made upon it. Glycerin has shared the fluctuations of opinion, incident to all new remedies, but if nothing should be discovered to counteract the good impression it has already created, it will, perhaps, eventually become generally employed, and be recognized and adopted as officinal in our Pharmacopœia.

Glycerin exists in most of the fixed oils and fatty substances, combined with various acids, from which it can be separated by the process of saponification; the acids leave their old combination, to unite with the basic principle, and the glycerin is set at liberty.

The following is the most common method of obtaining it. Lead plaster is made as directed by the U. S. Pharmacopœia. While yet fluid, a quantity of hot water is thrown in, and mixed intimately with the plaster. It is then allowed to separate, and the liquid being drawn off, is

evaporated to the consistence of a thin syrup, and treated with sulphuretted hydrogen, until a precipitate ceases to be thrown down; when it is filtered, boiled, and evaporated by a gentle heat, until it ceases to lose weight. It is generally colored as thus made, and requires to be passed through animal charcoal.

There is some difficulty in obtaining glycerin colorless, unless the water is driven off, before decolorization is attempted; as in evaporation even by a water bath, considerable color is obtained. The thickness of the liquid, renders its passage through the animal charcoal slow, but if thus prepared, a beautiful article can be obtained, very much the color and consistence of good castor oil. That sold as glycerin is considerably diluted, seldom having a greater specific gravity than 1.15 to 1.18, while the pure is 1.25 to 1.27.

With regard to the yield as thus prepared, an approximation was attempted by the following experiment. Three gallons of olive oil, and 15 lbs. (Troy) of English litharge, were made into a plaster, and three gallons of hot water added, and thoroughly mixed. The whole was then allowed to cool, and the liquid accurately drawn off. This was evaporated to the spec. grav. of 1.15, treated with sulphuretted hydrogen, filtered, boiled, and further evaporated, until 18 oz. (av.) Glycerin were obtained, of the specific gravity 1.25. There is an advantage in not allowing the liquid to become so concentrated, before sulphuretted hydrogen is passed into it, as, when it is too thick, its further treatment is rendered more difficult, both to filter the solution clear, and to get rid of the excess of gas, which under all circumstances it is not easy entirely to remove. About 1.1 is a proper density for its addition.

To ascertain the actual quantity of glycerin existing in olive oil, or rather separable by the usual method, half a pint of the best olive oil, was made up with $3\frac{1}{2}$ ounces (Troy) English litharge, into lead plaster. This was thoroughly de-

prived of its sweet taste, by repeatedly boiling it with water, and the resulting liquids were evaporated, and treated as in the former case. The product weighed 323 grains, showing that olive oil by this process, will yield nearly ten per cent of glycerin.

There are also other processes for making this substance. Among these is that where the spent ley of the soap boiler, is used for its preparation. There is also a formula in the Journal of Pharmacy for 1847, in which castor oil is decomposed by hydrochloric acid gas; and by agitation with water, evaporation, and treatment with ether, a syrupy mass is left behind, having all the properties of glycerin.

A small portion was also made by boiling olive oil with the milk of lime, until a union had taken place, mixing hot water with the mass, and drawing off the aqueous liquid. This was treated with carbonic acid, to precipitate any excess of lime, filtered, boiled, and evaporated, until a substance remained, having the taste and appearance of glycerin.

Glycerin, when pure, is a colorless, syrupy liquid, with little or no odor, a very sweet taste, and with a specific gravity of 1.25 to 1.27. It is insoluble in chloroform and ether. When subjected to a gradual increase of temperature, it is decomposed slowly, with the formation of acrolein; but thrown on a red hot surface, it takes fire suddenly and burns with a bright yellow flame. Its chemical reactions are various and very interesting. Its composition is $C_6 H_8 O_6$, or according to some, $C_6 H_7 O_5 + HO$.

It has been suggested that the removal of glycerin from lead plaster, has a tendency to injure its quality both as to adhesion and consistence. But it must be remembered, that formerly, when no attention was paid to the preservation of the glycerin, the malaxation with water which it had to undergo, removed nearly as much of it, as is taken away in the present process. But to make a practical test of the relative qualities of lead plaster, with and without glycerin, two parcels were taken, one containing its full amount, and the other entirely deprived

of it. The consistence of the latter was rather more brittle ; it had a shorter fracture and smoother, with no appearance of moisture, and retained its whiteness longer by keeping. A plaster was spread of each, and neither was thought to be superior to the other in regard to its adhesive properties. And when we consider that the lead plaster of commerce is never entirely *without* glycerin, or *with* the full quantity formed during the decomposition of the oil, it may safely be stated, that little or no deterioration, in the quality of lead plaster, takes place from the abstraction of the quantity of glycerin, which is obtained from it, and reserved for separate purposes.

The costliness of this article, prevents it from general application in pharmacy ; but I think, there are a few cases in which its employment would be advantageous. For instance in the pills of sulphate of quinine, which are directed in cases where it is important that disease should be speedily arrested, it is necessary that they should be quickly soluble in the stomach. Those made from gum and syrup, have been known to pass through the system untouched ; and should any objection be had to the tonic extracts which have sometimes been used, glycerin forms an excellent substitute. A trial was made, using different quantities of glycerin, to the same amount of the sulphate, and it was found, that those made according to the U. S. Pharmacopœia, in 24 hours became hard and brittle, while in the cases where glycerin was used, the entire amount of syrup being replaced by it, the mass retained the proper consistence. In the other cases the quality decreased in proportion to the amount of glycerin, in direct ratio. Glycerin nearly without water was used, being much better than the diluted article seen in commerce ; one drop of the former being equal in weight to two of the latter, and containing about twice as much anhydrous glycerin. There are other cases in which its use would be proper, but I merely propose this as applying to an important and valuable preparation.

As the various uses and peculiar properties of this substance gradually develope themselves, endeavors will be made to dis-

cover new methods to facilitate, and consequently lessen the expense of its preparation; and should any be so fortunate as to succeed in such attempts, and the price be sufficiently reduced, to warrant its general employment, we have every reason to believe, that it will eventually become an important article to the pharmacist, independent of its usefulness in the cause of afflicted humanity.

ART. XXXIII.—ON THE COMMERCIAL VARIETIES OF GINGER.

By JONATHAN PEREIRA, M. D., F. R. S.

In the preparation of a third edition of my *Elements of Materia Medica*, I have had my especial attention drawn to the different commercial varieties or sorts of the several articles of the *Materia Medica*, amongst many others to those of ginger. Perhaps the following notice of the varieties of ginger now met with in the English market may not be uninteresting to some of the readers of the *Pharmaceutical Journal*.

I have met with ginger in three different states in the English market, namely, in the fresh state, forming what was termed *green ginger*; secondly, in the state called *preserved ginger*; and, lastly, *dried ginger*, the usual form in which it is sold by grocers and druggists.

1. *Green Ginger.*

Small parcels of this have been brought over from Jamaica. The samples which I have met with were soft, and had the character of rhizomes which had been recently taken out of the ground. I am informed that in a commercial point of view they were worthless, most of them having perished on the journey. Recently none has been imported.

2. *Preserved Ginger.*

As this is chiefly used as a condiment and desert, it will

be unnecessary to describe it. Two sorts are now in commerce.

1. *Jamaica Preserved Ginger*.—This is the finest imported. It comes over in jars (seldom in barrels) of various sizes. Its value is 3s. per lb. duty paid.

2. *Barbadoes Preserved Ginger*.—This is not so fine as the preceding, and is seldom imported, say perhaps only once in two years. It comes packed in jars. Its value is from 2s. to 2s. 3d. per lb.

3. *China Preserved Ginger* is large but stringy. It is generally imported in jars of about 6 lbs. each, seldom in barrels. Its value is 1s. 6d. per lb.

4. *China dry Preserved Ginger* has been sliced before preserving. When preserved it is packed and imported in boxes. It is not often brought into the London market.

3. *Dried Ginger*.

GENERAL DESCRIPTION.—The *dried rhizome*, called in commerce *ginger-root* (*radix zingiberis*), occurs in flattish, jointed or branched, lobed palmate pieces, called *hands* or *races*. The largest rarely exceed four inches in length. The larger, bolder, and plumper the races, the more they are esteemed in commerce.

Some of the commercial sorts have not been deprived of their *epidermis*, which is dried on them, and give the races a shrivelled character. Other sorts have been carefully scraped and peeled while in the green state. The first are said to be *coated* or *unscraped*; the second, *uncoated*, or *decorticated*, or *scraped*. Considered with respect to the presence or absence of the coat, the commercial sorts of ginger may be thus arranged :—

Uncoated or Scraped.

Jamaica Ginger.

New Malabar “

New Bengal “

Coated or Unscraped.

Barbadoes Ginger.

Old Malabar “

Old Bengal “

African “

Although the color of ginger is an important consideration in determining the commercial value of this root, it is difficult to describe in words the different colors which characterise the various commercial sorts of ginger. The terms *white* and *black* ginger formerly in use, merely mean that some sorts are paler or whiter, others darker or blacker; but absolutely white or black ginger is of course unknown. But the different sorts of ginger pass almost insensibly from the one into the other, so that it is impossible to refer them absolutely to the pale or dark sorts. Mr. Faber tells me that, were he to classify them according to their external color, it would be thus:—

<i>Grey or Dark.</i>	<i>Intermediate.</i>	<i>Bright Yellow or Pale.</i>
Old Bengal.	Barbadoes.	Jamaica.
New Bengal.	Old Malabar.	New Malabar.
	African.	

The internal color of ginger and its softness or hardness, as observed by cutting it, is another important character. The brighter and paler the color, and the softer the texture, the more highly is ginger valued. Ginger which is dark and hard, or flinty to the cut, is of inferior value. A transverse section of the larger and more perfect pieces shows an outer, horny, resinous-looking zone, surrounding a farinaceous centre, which has a speckled appearance from the cut extremities of the fibres and cuts.

VARIETIES.—Several varieties of ginger are met with in English commerce. These we may conveniently arrange according to the countries producing them, in three classes: 1st, West Indian; 2dly, East Indian; 3dly, African.

1. *West Indian Gingers.*

This division of gingers includes two sorts, Jamaica and Barbadoes, which may be taken as the types of all other sorts of ginger. Unlike the East Indian kinds, they are rarely wormy.

1. JAMAICA GINGER (*radix zingiberis Jamaicensis*).—

The sort of Jamaica ginger now found in commerce was formerly called *white ginger*, to distinguish it from an unscraped sort, which was termed *black ginger*. The latter does not now occur in English commerce.

Jamaica ginger is imported in barrels holding one cwt. each. It is a scraped or uncoated pale sort. When of fine quality it consists of large, branched, plump, and fleshy soft races, whose texture is fibrous and mealy, and which externally are yellowish white or pale buff, and internally, when cut present a bright but pale tint. Inferior samples consist of small shrivelled races, which have an ash-grey externally, present a brownish color internally when cut, and have a hard or flinty texture. Good Jamaica ginger yields a beautiful bright straw-yellow, somewhat buffy, powder.

2. BARBADOES GINGER (*radix zingiberis Barbadosensis*).—This is imported in bags of about sixty or seventy pounds. It is an unscraped, or coated, somewhat pale sort.

Its races are shorter, less branched, flatter, and darker colored than Jamaica ginger, and are covered with a corrugated epidermis.

2. *East Indian Gingers.*

This division includes four sorts of ginger, two from the Malabar coast and two from Bengal. They are more liable to be wormy than either West Indian or African ginger.

3. MALABAR GINGER (*radix zingiberis Malabarici*).—Formerly one kind only of ginger was exported from this coast, namely, a coated or unscraped sort, which is sometimes called the “old sort of Malabar ginger,” to distinguish it from the uncoated or scraped kind which of late years has been brought from this part of the world, under the name of “new sort of Malabar ginger.” I shall distinguish them by the terms *coated* and *uncoated*.

a. COATED MALABAR GINGER; *unscraped Malabar ginger*; *old sort of Malabar ginger*; *common Malabar ginger*; *Bombay ginger*. This sort is imported exclusively from

Bombay. It comes over in bags and pockets. It is a coated sort, of a darker color than the West Indian sorts, but paler than the common unscraped Bengal sort.

In my samples, a portion of the coat (*epidermis*) has fallen or been rubbed off, and the exposed external portion of the body of the ginger is darker colored than the remaining portion of the coat. When cut, the internal surface is found to be rather pale, though somewhat darker than that of Jamaica ginger. The races run small, and not much branched.

β. UNCOATED MALABAR GINGER; *new sort of Malabar ginger; Tellicherry ginger; Calicut ginger; Cochin ginger.* This sort of ginger first appeared in the London market about the year 1841, having been imported by Messrs. Kensington, Payne, and Young. The quality being exceedingly fine, it fetched from 75s. to 100s. per cwt., at the time when the old sort fetched only from 15s. to 20s. per cwt. Its races were large, bold, and very much branched.

When cut into, it was found to be quite soft, even down to the centre, the cut surface presenting a lemon tint. Its flavor was very aromatic. These qualities made it a great favorite with the trade, and, in consequence, it rose in value, and for a time fetched £6 or £7 per cwt. But being brought over in very large quantities, it soon declined considerably in price, and this produced carelessness on the part of the cultivators. Another circumstance which tended to reduce its value was the great havoc committed on it by the worm during the voyage, so that it frequently happened that, upon landing here, whole cases of ginger were converted into mere powder.

The first importation was from Baypore, near Calicut, on the Malabar coast; afterwards some came from Tellicherry, and subsequently large parcels of it have come from Cochin and Calicut, all on the same coast. The quality and flavor of the later importations have been for the most art much inferior to those of the first samples and in gene-

ral the prices have ranged from 42s. to 65s. per cwt. Recently, however, samples of an improved quality have been received which fetched from 65s. to 130s. per cwt.

This sort of Malabar ginger is imported in chests, casks, or bags. It is a scraped sort, and occurs in fine large branching races, having much of the character of Jamaica ginger, but having more of a brownish or reddish tint externally, and being very apt to be wormy. In flavor it resembles the Jamaica sort.

It is said to be grown at or near Calicut, and to be produced by the Jamaica plant transplanted to the Malabar coast; but how true this statement may be I know not.

4. BENGAL GINGER (*radix zingiberis Bengalensis*.) Two kinds of ginger are brought to us from Bengal—the coated or old sort, and the uncoated or new sort.

a. COATED BENGAL GINGER; *common Bengal ginger; old sort of Bengal ginger*. This is imported in bags. It is an unscraped dark-colored ginger. The races are somewhat larger and plumper, and rather less liable to be wormy, than the coated Malabar ginger.

The coat (*epidermis*) is greyish yellow, shrivelled and cracked down the face of the races, exposing the body of the root, which is much darker colored (greyish black) than the coat itself; so that the races are remarkable for their bi-colored character. To the cut it is more or less hard (*flinty* in the language of the dealers,) and presents a darker color than the other sorts. Of all the gingers now met with in commerce, it most deserves the name of *black-ginger*. It is darker colored than the coated Malabar ginger, and is otherwise so peculiar that dealers can never confound the two. Both sorts usually fetch about the same price.

β. UNCOATED BENGAL GINGER; *scraped Bengal ginger; new sort of Bengal ginger; Calicut sort of Bengal ginger*.—Soon after the uncoated or new sort of Malabar ginger came into the market, the Bengal growers, finding that

they could obtain only from 15s. to 20s. per cwt. for ginger, while their Malabar competitors got from 75s. to 100s. per cwt., were aroused to compete with the latter. They accordingly, as I am informed, began to cultivate the new Malabar plant, or, as it was called, the Tellicherry sort. In consequence, large quantities of this new Bengal sort were soon after received from Calcutta, and, being very large and bold in the race, captivated the buyers, who purchased freely at from £5 to £7 per cwt. But upon being brought into use it was found to be destitute of those intrinsically good qualities for which the new Malabar ginger was distinguished. It accordingly fell in price to 35s. or 40s. per cwt., and the original purchasers suffered a loss of at least 50 per cent. It is now scarcely met with.

This kind of ginger is imported in chests of $1\frac{1}{2}$ cwt. It is a scraped sort, and is darker than Jamaica ginger. It is as plump as the new Malabar sort, but the races are not so large. To the cut it is more or less hard or flinty and dark. In its color and hardness it resembles the common or coated Bengal sort; but in plumpness, the uncoated Malabar sort.

3. *African Ginger.*

5. SIERRA LEONE GINGER.—All the African ginger which I have met with has been imported from Sierra Leone. It comes over in casks or bags.

It is a coated or unscraped sort. The races are generally rather larger, but less plump, than those of the Barbadoes sort, which in other respects they resemble, and to which they are about equal in commercial value.

4. *China Ginger.*

Mr. F. Bassermann has described a new sort of ginger from China. This is quite unknown in the English market indeed I cannot find that any of even the most experienced dealers ever heard of China dried ginger.* As, however,

* I have heard *Cochin Ginger* called by mistake *Cochin-China Ginger*, and for brevity *China ginger*.

the Chinese export preserved ginger, it is not improbable that they may occasionally have also exported dried ginger; but the former differential duties which existed in England would probably have prevented its introduction here.

Mr. Bassermann states that a cargo of 5000 chests was brought to Amsterdam in 1834 from Canton. The chests were small, containing each about $2\frac{1}{2}$ lbs. Externally they were covered by a dark green paper with black ornaments and Chinese characters; and in addition to the name of the ship there was the following superscription: *Ngo-Nang-Gong, Extra Gember*. Internally, the chests were lined with fine paper, and under the lid there was a red leaf of paper with Chinese writing.

The ginger was large and broad, externally dark brown, and to the fracture dark, shining and resinous. It did not break easily. The epidermis was very wrinkled and shrivelled. The odor and flavor were stronger than those of the best Bengal sort, and were almost equal to the West Indian kind. Its powder was darker than that of either the West Indian or Bengal sorts, and contained some short fibres and dark shining foliaceous parts.

WASHING AND BLEACHING.—The wholesale dealers sometimes wash ginger after its importation, and before it is offered for sale. I am informed that this operation is done with water only. In this state it is termed *washed ginger*. But much of the ginger which is imported is bleached before it is sold to the shopkeepers. This is done by washing it in a solution of chloride of lime and exposing it to the fumes of burning sulphur (*i. e.*, to sulphurous acid.) *Bleached ginger* has a white chalky appearance (whence its name of *whitewashed ginger*), and occasionally a feeble odor somewhat like that of chlorine. Its appearance is supposed to be greatly improved by this bleaching process.

COMMERCIAL ASSORTMENT.—The wholesale dealers assort

some kinds of ginger, according to their quality and commercial value ; but sell other kinds unassorted

a. Assorted Gingers.—The gingers which are assorted are the scraped or uncoated sorts, namely, Jamaica, scraped Malabar, and scraped Bengal ginger. These are assorted into several qualities, usually distinguished either by their price, or as first, second, third, and fourth qualities. Considered with respect to their characters, these assorted gingers may be arranged as follows :

1. Bold, soft, and bright.
2. Smaller, but soft and bright.
3. Flinty and dark.
4. Shrivelled, and only fit for grinding.

β. Unassorted Gingers.—The unscraped or coated sorts do not undergo any assortment, but are sold unassorted. This division includes four sorts, *viz.* :

5. African.
6. Barbados.
7. Common or unscraped Bengal.
8. Common or unscraped Malabar.

On the continent unassorted gingers are the kinds chiefly in use. Barbadoes and African are the best of these sorts. Unscraped Bengal ginger being generally plumper and sounder than unscraped Malabar, is generally preferred to the latter sort.

The following is a classification of ginger according to its commercial value, exclusive of duty, in September 1849, as bought of the importers in Mincing Lane :

L4 to L7 per cwt. Used in England.) Jamaica, New Malabar.	L2 to L4. (Used in England.) New Bengal.	30s. to 35s. (Used in England and on the Continent.) Barbadoes, African.	23s. to 25s. Used chiefly on the Continent. Old Malabar. Old Bengal.
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Pharmaceutical Journal, December, 1849.

ART. XXXIV.—EAST INDIA SENNA.

BY DR. ROYLE, F. R. S., &c.,

Professor of Materia Medica at King's College.

I send you a specimen of the senna grown by Dr. Gibson, and with which he has supplied the military hospitals; the surplus, amounting to 17 cwt., he has sent to this country, to see how it will answer the purposes of cultivators there and of purchasers here. We all know the Alexandrian senna is much adulterated, and it is almost sure to continue to be so, for the demand is much greater than the supply, and thus this is likely to be, with the distant carriage on camels before it reaches the banks of the Nile. The African and Arabian senna, which reaches us by the way of Bombay, and is called East Indian senna, is not appreciated here, though genuine and pure, because it is not carefully gathered nor clean picked. The Tinnevelly senna, however, which was grown from Arabian seed, holds the first place in the market, because it is well grown and carefully picked. Many years since I grew senna, in the Saharunpore Botanic Garden, both from Baya senna-seed, and from some seed sent me by Sir Charles, afterward Lord Metcalfe. Both the seeds produced the same species, which I have figured in my *Illustrations of Himalaya Botany*. The senna was pronounced by Dr. Twining, after using it in the General Hospital, equal to the best. The same kind of senna has again been tried in the hospitals at Saharunpore, as I myself had done before sending it to Calcutta. Dr. Bolton who submitted the garden senna to this second set of experiments at Saharunpore, pronounced it equal if not superior to the senna of commerce, acting without griping, and forming an excellent purgative. It was determined in consequence that the Government hospitals should all be supplied with senna grown in the garden, when a planter in the neighborhood of Agra offered to produce it in the

required quantities, and of equal quality, near Agra. Dr. Gibson has however for some years been growing it in the Bombay Presidency for the public service there, and where the senna is equally well approved of. By the small specimen you will see in the form of the leaves that they are those of the true officinal senna. The color is good, and the leaves have been carefully picked. They are smaller than those of Tinnevely senna, being grown in a drier climate, that of the Deccan.—*Pharmaceutical Journal, February, 1850.*

ART. XXXV.—ON THE CEPHAELIS IPECACUANHA.

BY M. WEDDELL.

The introduction of *ipecacuanha* as a European remedy does not date anterior to the end of the seventeenth century. The first discovery of it, no doubt, is due to the Indians who preceded the Portuguese in the Brazilian territories; or, if we are to believe tradition, we may consider man, as in the case of the cinchona bark, to have been preceded by the animals.

The origin of the word *ipecacuanha* is very obscure, and in no part of Brazil is it employed to designate the *Cephaelis*, while, on the contrary, that of *Poaya* is most generally used.

Modern authors who have written on the *Cephaelis ipecacuanha* state it to exist in a vast zone, comprising all the provinces of Brazil, from the equator to the tropic of Capricorn, and between the Atlantic and the mountainous country of the interior. During late years, however, this region has become much extended; and at the present time its longitude is equal to its latitude. In the year 1824 the *Cephaelis* was discovered in the province of Matto-Grosso; but no exportation of it took place until about the year 1832.

It is this part of the Brazils which now wholly maintains the European commerce of it.

The appearance presented by the forests in which the *Cephaelis* grows is not easily forgotten. Nearly all those of Matto-Grosso are situated in the basin of Rio-Paraguay, or its tributaries, about the small village of Villa-Maria. Generally, however, the plant does not grow in the immediate vicinity of rivers, as the periodical inundations to which these are subjected, are unfavorable to its free vegetation.

It is in situations where a slight elevation of land preserves it from these submersions, that the *Cephaelis* is mostly met with. It grows in the shade of those majestic trees which constitute the intertropical forests, and more particularly in the moist sand, impregnated with vegetable remains, which borders on the marshes planted with *Mauritia*, *Iriarteia*, and tree ferns.

In size the *Cephaelis* is scarcely equal to the small daphne of our woods, which it slightly resembles; it rarely grows alone, but almost always in small clumps, that the collectors of *Poaya*, or as they are called *Poayeros*, known by the name of *Redoleros*.

The method adopted in collecting the root of the *Cephaelis* is as follows: The *Poayero* grasps in one hand, if possible, all the stems forming one of these clumps, whilst with the other he pushes under the roots a pointed stick giving it a swinging motion. By this means the earth surrounding the roots gives way, and when the operation is performed with dexterity, they are all withdrawn at the same time, and almost always without fracture. The *Poayero* then separates the portion required, and places it in a bag carried for the purpose; he then proceeds to the next clump, and so on. An ordinary workman may collect in a day about from three to six kilogrammes of ipecacuanha, which in desiccation loses about half its weight. This latter operation takes place in powerful sunshine.

The propagation of the *Cephaelis* is by seed; but in

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localities where it is constantly exported it is effected by means of portions of the roots accidentally left in the ground by the *Poayeros*. Each of these fragments after a certain time produces a bud, which forms a fresh plant. The vegetation of the *Cephaelis* in round clumps is also probably consequent on this particular manner of propagation. It, therefore, appears from this fact that the exportation of ipecacuanha will have an effect contrary to many analogous cases, that of subjecting the *Cephaelis* to a mode of cultivation particularly suited to it, and the fires which occur so frequently in the forests, will tend to this favorable result, by clearing the surface of the earth of those accumulations of vegetable matter, which at last frequently choke up and kill even the adult plants themselves.—*Pharmaceutical Journal*, January, 1850, from *Repertoire de Pharmacie*.

ART. XXXI.—ON THE ABSORPTION OF SALINE SUBSTANCES BY CHARCOAL.

By M. ESPRIT.

A very remarkable property of carbon is the precipitation of certain metallic salts from their solution in water by animal charcoal. This curious property, the discovery of which is attributed to M. Payen, appears to have been previously noticed by Schaub. Subsequently M. Payen announced that charcoal removed lime and salts of lime from their solution in water.—A few years later Dubrunfaut, confirmed the observations of M. Payen, and announced as a general principle that the carbon saturated the alkalies and appropriated them; that it, moreover, appropriated the salts, and especially the calcareous salts which occur in the juice of the beet-root after defecation; and he insisted on the advantages which the two-fold property presented in the manufacture of beet-root sugar.—Graham, whose experiments date from 1829, examined prin-

cipally the action of charcoal upon the acetate and nitrate of lead, arsenious acid, nitrate of silver, sulphate of copper and ammonical sulphate of copper, hydrate of lead dissolved in potash, solution of iodine, Labarraque's solution, chloride of lime, and liquid chlorine. He states that, however large the quantity of charcoal employed, he was never able to precipitate arsenious acid and sulphate of copper. The contrary was the case with all the other salts. M. Lassaigne found that charcoal, placed in contact with iodide of starch and with a solution of iodine, removes the iodine from the liquid. M. Dupasquier observed that vegetable charcoal absorbs quickly and even in considerable quantity the alkaline sulphurets. I have repeated this experiment comparatively with vegetable and animal charcoal, and have found that it requires nearly three and a half times more of the former than of the latter to obtain the same result.

In 1845, M. Chevalier published in the '*Annales d'Hygiène*,' that the acetate and nitrate of lead in solution in water, wine, or vinegar, might be removed from these liquids by means of charcoal, with or without the assistance of heat. He was led to believe that this new property would furnish a ready and easy means of removing from some orange-flower waters, which had been kept in badly-tinned vessels, the lead salts they might have dissolved, without depriving the waters of their odor. The experiments which he made on this subject perfectly confirmed his suppositions. M. Chevalier also observes very correctly, that this property of charcoal of combining with the metallic oxides may frequently have been the source of error in chemico-legal inquiries.

This question has also been examined by M. Girardin, who found that not only the majority of salts, but even most mineral substances, were removed from solution by animal charcoal; a property which he turned to excellent account in depriving water in newly constructed reservoirs of a disagreeable flavor, which renders its use for a long time impossible, owing to the lime which it removes from the walls.

I have still to mention the experiments made by Messrs. Garrod and Weppen; but the results obtained by these two chemists are so little in accordance, and differ so much from those published by Prof. Graham, that I have considered it indispensable to repeat their experiments and in different ways, in order to ascertain whether the difference of the results at which they arrived should not be principally attributed to the varied conditions under which they operated. All my experiments were made with three distinct kinds of charcoal:—

1. With animal black, freed from the carbonate of lime which it contained, but still retaining the phosphate.

2. With animal charcoal, digested with hydrochloric acid, and washed with distilled water until what passed through no longer furnished a precipitate with oxalate of ammonia or with nitrate of silver: a considerable quantity of this charcoal, on calcination in a platinum crucible, left but an insignificant residue of silica.

3. With blood-charcoal, calcined twice with a mixture of carbonate of soda and potash, and then washed with distilled water until it no longer furnished a trace of alkaline cyanide.

I tried the action of these charcoals in three different manners: 1st, by mixing a known weight of charcoal with a certain quantity of saline solution, and setting the mixture aside; 2nd, by boiling a known weight of charcoal with the saline solution; 3rd, by filtering the metallic solution through a layer of charcoal placed in the neck of a retort, and acting thus by way of displacement.

Of these different methods, the third is that which appeared to be the most advantageous, only it has the inconvenience of being rather tedious and also somewhat capricious. To obtain a satisfactory result, it is requisite that the filtration should proceed slowly, otherwise some of the liquid passes without being decomposed. The second process is undoubtedly quicker, but it always appeared to require a greater proportion of charcoal for the same quantity of salt.

The solutions of metallic salts upon which I operated are the following :—The acetate, sulphate and nitrate of copper ; the acetate, sulphate, chloride of zinc and oxide of zinc dissolved in ammonia ; acetate and nitrate of lead ; acetate and sulphate of iron ; tartar emetic ; the nitrate and sulphate of silver ; and the chloride dissolved in ammonia ; corrosive sublimate ; nitrate of cobalt ; sulphate of cadmium ; arsenious acid ; nitrate and muriate of baryta ; and the sulphate of soda, potash and magnesia.

With the exception of the three alkaline sulphates, the nitrate of copper and arsenious acid, which appear to be absorbed only within exceedingly restricted limits, all the other salts were absorbed with greater or less energy.

5 parts of blood-charcoal calcined with potash sufficed to precipitate entirely the following salts ; acetate and nitrate of lead ; ammoniacal sulphate of copper ; the sulphate and nitrate of silver, and the chloride dissolved in ammonia ; the chloride of zinc, and oxide of zinc dissolved in potash.

20 parts of charcoal are required to precipitate the sulphate and acetate of copper, corrosive sublimate, nitrate of cobalt, sulphate of cadmium, tartar-emetic, sulphate of zinc, and chloride of barium.

The precipitation, however is only perfect by the first five salts ; and it appeared very difficult, even by increasing the proportion of charcoal, to remove entirely the last traces of the four others, which are it is true sometimes very minute, but can still be detected. Thus the quantity of tartar-emetic which is not absorbed is so small, that its presence is no longer indicated by sulphuretted hydrogen : but it may still be discovered with Marsh's apparatus.

The proportions of charcoal above indicated are only strictly accurate for the salts of copper ; for the others they are only approximative ; but they nevertheless approach very closely the true limits. The following is the plan which I followed to ascertain the quantity of charcoal necessary for the absorption of the sulphate and acetate of copper. I dis-

solved in 8 grms. of acid diluted with water 2 grms. of oxide of copper obtained by calcining the nitrate, evaporated the solution to dryness, then redissolved the salt in 100 grms. of distilled water, and placed the solution in a wide mouthed bottle with a ground stopper. I then poured some ammonia into it until the precipitate which formed at first had redissolved, and the liquid had become perfectly clear; the bottle was finally filled with boiled distilled water, and a bright slip of copper, the weight of which was known, inserted. In the course of five days the experiment was completed, and the solution had become perfectly colorless; the slip of copper was then removed, washed, wiped dry with care and weighed. It had lost $\frac{1}{4}$ of its weight. The experiment, repeated several times in the same manner, furnished the same result.

As the oxide of copper contains precisely half the quantity of copper contained in the suboxide, it proved that my primitive solution contained $\frac{1}{4}$ copper. If, therefore, after having been filtered through charcoal, it contained less copper, that must have held it back. A solution of copper was therefore prepared like the preceding, and transferred into the displacement apparatus with 10 grms. of animal charcoal. As soon as the operation was finished, I washed the charcoal with a little distilled water, added this wash-water to the filtered liquid, supersaturated it with ammonia, &c. As soon as the decoloration was complete, I removed the slip of copper to weigh it. It had lost only 0.75 of its weight; the charcoal had therefore retained 0.65 copper, or nearly half of what the solution contained. I repeated the experiment, and obtained 0.70, and a third time 0.75.

With regard to the alkaline sulphates, they always appeared to be absorbed in very minute proportions; for I was not only able to detect their presence readily by means of reagents, but sometimes even from the bitter taste of the solution, especially when the liquid had been slightly concentrated.

I next proceeded to ascertain the quantity of arsenious acid which animal charcoal is capable of absorbing. Prof. Graham had asserted that no absorption occurs; Dr. Garrod states, on the contrary, that it is so perfect and quick, that he did not fear to recommend charcoal powder as a far better antidote to arsenic than the hydrated sesquioxide of iron. I adopted the following plan for testing the correctness of these assertions. After having found that, even on employing considerable quantities of charcoal, arsenious acid was constantly detected in the filtered liquid, I endeavored to ascertain whether any had been absorbed. For this purpose I dissolved 10 grms. of arsenious acid in a litre of distilled water; I then took 10 cub. centim. of this solution, to which I added 10 cub. centim. ClH , with 100 cub. centim. distilled water, and which served to determine the strength of a solution of permanganate of potash, intended for estimating the arsenic according to M. Bussy's process. Having determined the strength of the normal solution, I poured 100 cub. centim. of the solution of arsenious acid over different quantities of charcoal; and when the filtration was finished, I washed the charcoal with a little distilled water, so as to re-obtain 100 cub. centim. Of this I took the first time 10 cub. centim., and added to them 5 cub. centim. ClH and 100 cub. centim. distilled water. I then added with precaution the permanganate of potash.—The following results were obtained with blood charcoal:—

10 grms. of charcoal absorbed	0.2 AsO_3
20 ...	0.3 ...
40 ...	0.4 ...

Upon boiling the arsenical solution with the charcoal, the results were somewhat different:

10 grms. of charcoal absorbed	0.3 AsO_3
20 ...	0.5 ...
40 ...	0.7 ...

A still more difficult question remained to be solved—How does the charcoal act under these circumstances? Is

there any reduction? or is it merely a simple phenomenon of mechanical absorption, as in dyeing? I believe the latter occurs most frequently; but would except the salts of silver, and all those metals the oxides of which are readily reduced. I would also except the salts of lead, which appear to be converted, for the greater part at least, into the state of carbonate. This is partly indicated by the white deposit which covers the surface, and even penetrates pretty far into the interior of the layer of charcoal through which a solution of a lead salt has been filtered.

There is likewise frequently a change in the composition of the salt; sometimes a subsalt is formed, and free acid is found in the liquid; sometimes a subsalt is formed, which is retained by the charcoal, whilst a very acid salt passes through in the liquid: this is what undoubtedly happens with the sulphate of iron and the sulphate of zinc, which renders it almost impossible to precipitate the last portions of these salts; frequently, however, it is merely a simple absorption. Thus if 1 grm. of acetate of copper is dissolved in 100 grms. of distilled water, the liquor acidulated with one drop of acetic acid, and the solution poured over 20 grms. of well-washed animal charcoal placed in the neck of a retort, not a trace of copper will be found in the liquid if the filtration proceeds regularly, and not too rapidly; the charcoal may even be washed with 100 grms. of distilled water, the liquids united and concentrated, and still no copper be indicated by reagents. But if the charcoal be triturated in a glass mortar with water, so as to isolate the molecules and thus to assist the solvent action of the water, it removes some of the salt which the charcoal had retained, and its presence is now readily detected.

The following experiment will serve still better to establish my view. 1 grm. of corrosive sublimate was dissolved in 100 grms. of distilled water, and the solution filtered through 20 grms. of well washed animal charcoal. At the end of thirty-six hours half the liquid had passed through;

the presence of a salt of mercury was sought for in it with potash, sulphuret of ammonium, and iodide of potassium, but no change was produced by these reagents.

At the end of twice forty-eight hours the whole of the liquid had filtered, the charcoal was washed with distilled water, and the same tests applied again with the same result. But perhaps the bichloride of mercury had undergone some alteration in its composition in contact with the charcoal; perhaps it had been reduced to a state of protochloride, and consequently become insoluble. Such is the opinion of Weppen; which, however, does not agree with the observation made by Fourcroy, who in his *Système des Connaissances Chimiques*, states in a positive manner that the charcoal has no action upon corrosive sublimate, either with or without the assistance of heat.

The following experiment will, I think, decide the question. The charcoal which had taken up the corrosive sublimate was washed with a mixture of alcohol and ether, which quickly dissolved the mercurial salt in the state of corrosive sublimate and in such quantity, that it became possible to trace, with a tube dipped in it, characters of a brilliant red upon a plate of porcelain which had been moistened with iodide of potassium. The ethereal solution left on evaporation a white powder, which, dissolved in distilled water, furnished with potash an orange precipitate; with hydrosulphate of ammonia, a white precipitate, which soon turned black; and lastly, with iodide of potassium a red precipitate. It appears evident, therefore, that there was no reduction, but a simple phenomenon of absorption, analogous to what takes place in the decoloration of indigo, where the charcoal can be deprived of the coloring matter which it had combined with by an alkaline solution; that is to say, by a substance having a greater affinity for it than the charcoal. The same occurs when the affinity of the charcoal for the corrosive sublimate is overcome by the stronger affinity of the ether or alcohol; the salt can then be re-dissolved; or

as was the case with the acetate of copper, when the affinity of the charcoal was weakened by mechanical means by isolating the molecules, the water is able to re-take up the salt which it had previously abandoned.

This explanation, which I venture to propose will, I think, not appear surprising, for we are prepared for it by the behaviour of charcoal under other circumstances. The way in which it removes lime and calcareous salts is a phenomenon of pure absorption; there can have been no reduction in such a case. Messrs. Bussy and Payen have satisfactorily demonstrated that there is no chemical action in the decoloration of liquids; and the way in which it combines with the bitter principles of vegetables can only be explained by a peculiar affinity.

The attention of chemists was called to this new and curious property by Mr. Warington. It had, it is true, already been pointed out by M. Duburgua, who had long before stated that tincture of gentian was entirely deprived of its bitterness by being filtered through charcoal; by M. Chevalier in 1826; by M. Holph in 1831; and M. Rhighini six or seven years back, who advised the use of charcoal as an excellent plan for obtaining the bitter principle of wormwood.

Notwithstanding all these experiments, the property which this substance possesses of combining with certain organic principles was nearly forgotten, when, in 1845, Mr. Warington again called the attention of chemists to it. Having been requested by a brewer to find a convenient and easy method for decolorizing large quantities of brown ale, so as to give it the appearance of pale ale, he immediately thought of charcoal. The beer was decolorized, but had become perfectly insipid. Little prepared for such a result, Mr. Warington repeated his experiments upon different kinds of beer, and lastly upon infusions of hops, wormwood, decoctions of gentian, nux vomica, and even aloes

All these substances lost their bitter taste except nux vomica.

M. Weppen somewhat extended these experiments, and succeeded in causing the bitterness of decoctions of columbo, quassia, cascarilla, and buckbean to disappear.

At the same period, M. Chevalier announced that the salts furnished by organic substances are removed more or less readily and entirely by treatment with charcoal and the assistance of heat; that in some cases the absorbing property of charcoal might be turned to account for isolating the poisonous substances held in solution.

Subsequently, Dr. Garrod proposed charcoal as a certain antidote for all the vegetable alkalies.

Lastly, in a very recent communication, M. Lebourdais has employed charcoal to obtain certain vegetable alkalies: thus, after having deprived a decoction of *ilex* of its bitterness, he was able, by treating the dried charcoal with boiling alcohol, to redissolve the bitter principle; and then, by distilling to a syrupy consistence to remove the greater proportion of the alcohol, and evaporating to dryness, to obtain an amorphous neutral substance, to which he gave the name of *ilicine*. By treating infusions of *Scilla*, flowers of *Arnica*, a decoction of the root of Colombo and of Colocynth in the same manner, M. Lebourdais obtained what he has called Scillitine, Arnicine, Columbine, and Colocynthine.

I have also deprived, by the same means, aqueous solutions of strychnine, sulphate of quinine, decoction of box, root of *Rumex patientia*, of *Simaruba*, the tinctures of columbo, sarsaparilla, dulcamara, cinchona and rhubarb, &c. of their bitter taste.

The tinctures of benzoin, kino, and gamboge, were deprived of their resinous principle to such an extent, as to be no longer rendered turbid by the addition of water.

I was desirous of ascertaining whether any other porous substances possessed this property of charcoal. I tried pumice-stone, and obtained no good result; but by means of

platinum-black I have succeeded in depriving of their taste and color a number tinctures; the tincture of columbo succeeded best; 2 grms. of platinum entirely deprived 8 grms. of tincture of taste, but at the same time there is produced a certain quantity of aldehyde and acetic acid. Unfortunately, the action of platinum black appears to be quickly exhausted; and it does not appear to me to stand in any relation to the force which might be expected from its excessive porosity and extreme division; I am therefore led to believe that the property possessed by charcoal is not solely due to its porosity, but that it is also owing to some peculiar affinity.—*Journ. de Pharm.* Sept. and Oct. 1849, and *Chem. Gaz.* Nov. 16, 1849.

ART. XXXVII.—BOTANICAL AND PHARMACEUTICAL
DESIDERATA.

BY SIR WILLIAM HOOKER.

(From the Manual of Scientific Enquiry, Edited by Sir J. F. W. Herschel, Bart.)

AFRICA (INCLUDING ARABIA AND ABYSSINIA.)

Cape Aloes.—What is the particular species of *Aloe* affording the drug of this name? What is the kind used at Bethelsdorp, near Algoa Bay?

Madagascar Cardamom.—Is it *Amomum angustifolium*? Specimens of the plant and fruit should be sent home.

Scitamineous Fruits of Western Africa.—A full collection of these (comprising the various kinds of cardamom), the plants, with roots and fruit, should be transmitted home, with the native names appended to them.

Myrrh.—Is the myrrh of commerce produced by one vegetable species, or several? If by several, specimens of each kind and of the plant affording it are desirable, accompanied by the native appellations. It is particularly im-

portant to know whether the myrrh of commerce be the growth of Arabia or of Abyssinia and the adjacent parts of Africa.

Euphorbium Gum.—What is the species of *Euphorbia* affording the substance thus called in commerce, and which comes from Mogadore? The stems found in the commercial *Euphorbium* are not those of the plant figured in Jackson's *Morocco*, nor yet are they those of *Euphorbia officinarum* or *E. Canariensis*.

Shea Butter.—Living plants and specimens in flowers and fruits are required.

Galam Butter.—Is this identical with the Shea butter of Park?

Camwood.—The source of the dye-wood so called, from the Gold Coast, with specimens of the tree are a desideratum.

Bucku of the South African Hottentots.—To determine the different kinds collected by the natives.

Senna.—What plant yields the African Senna? Richardson says it is brought from Ghat in the Sahara.

African Oak or *African Teak*.—This wood, though largely imported by our royal dockyards from the Western coast of Africa, is totally unknown botanically.

Ichaboe Resin.—The Ichaboe ships did, on more than one occasion, bring from the adjacent shores of Africa a gum-resin, constituted of the dead stems of a *Geranium*, allied to, if not identical with, the South African *Geranium spinosum* of Linnæus (*Monsonia Burmanni*, D. C.). An account of this substance appeared in Eden's voyage in search for Nitre and the true nature of Guano. London: 1846.) None is now to be procured in England, and it is believed that the nature and property of this singular gum-resin were not examined. Perfect specimens of the gum-resin and the plant are desired.

N. B. Much information remains to be obtained respecting the useful woods, gums, dye-stuffs, &c., of Western Africa.

ASIA (INCLUDING AUSTRALIA.)

[N. B. Being sent by way of the Red Sea, it may be remarked that some of the products, enumerated under this head are derived from Abyssinia, Arabia, or the east coast of Africa.]

Ammoniacum.—Determine the true origin of this gum-resin by specimens of the plant yielding it in Persia, forty-two miles south of Ispahan. Another kind is equally worthy of inquiry from Morocco in Africa, with the gum-resin and exact locality.

Sagapenum.—A gum-resin: its source? It is said to come from Persia, and to be derived from a *Ferula*. Specimens of the plant with the gum-resin which it affords are desirable.

Galbanum.—Whence obtained? It is brought to us from Singapore and Persia.

Gamboge.—Specimens in flower, and the fruit of the plant affording the gamboge of Siam, and the mode of extracting this and other kinds of gamboge, such as that of Ceylon, &c.

Animi Gum, or *Piney Varnish*, said to be produced by *Vateria Indica*.

Copal.—The origin of this gum-resin in India?

Bdellium.—The source of the Persian and African *false myrrhs* of this name, the localities producing them, the native names, and specimens both of the products and the plants.

Olibanum.—The above remarks apply to olibanum.

Elemi.—The source of the five varieties of Elemi, viz: 1. Holland Elemi. 2. Brazilian Elemi. 3. East Indian Elemi, in bamboos. 4. Manilla Elemi; and 5. Mexican Elemi. Samples from the various countries, with the plants and native appellations, should be transmitted for verification. Is any *Elemi* procured from Ceylon? (Obtain perfect specimens.)

Tragacanth.—The tragacanth of Mount Ida and Moun

Libanus have never been correctly traced to the plants which yield them, nor has Tournefort's relation of the formation of this substance in the bark been confirmed. It is still more important to ascertain if the tragacanth of Eze-room is brought into British commerce, and whether it is yielded by the *Astragalus strobiliferus*.

Senna.—The source of the East Indian or Mocha senna. Is it really the foliage of *Cassia lanceolata*?

Catechu.—To observe the processes by which the various kinds of *Catechu*, *Cutch*, *Terra Japonica*, and *Gambir* are obtained; and if from trees, whether from others besides *Acacia Catechu*, *Areca Catechu*, and *Uncaria Gambir*. We want to identify the trees with the respective extracts.

Cubebs.—Does *Piper Cubeba* or *Piper Caninum* in Java yield cubebs? If both, which gives the best?

Cassia.—Botanical specimens of the plants *seen* to yield *Cassia bark* in Kwagse, China, Malabar, Egypt (and Brazil.)

Cassia-buds of the grocers'-shops.—To procure specimens of the bark in Cochin China, and Japan, and flowering specimens for the Herbarium.

Rhubarb.—The true source of the medicinal rhubarb, and especially of the Batavian Rhubarb. Strange to say, we are still in the dark respecting the real origin of this most valuable drug! In this and all such cases the drug should be procured by one who is an eye-witness to its being gathered, and specimens of the foliage and fruit should accompany it, and be carefully dried for the Herbarium on the spot.

Arrow-root.—The sources of the East Indian arrow-root. It is made largely at Travancore.

Salep.—The different plants which yield salep in Asia Minor, Persia, and especially the best kinds.

Aloes.—The true sources of the Soccotrine, Clear, Bombay, Hepatic, East Indian, and Mocha aloes.

Minia Batta or *Stone Oil*, from Borneo.—Whence is this solid oil or fat obtained? Is it abundant or rare?

Gutta Percha.—That of Singapore is ascertained to be the product of a new plant, *Isonandra Gutta* of Hooker, in the *London Journal of Botany*, vol. vi. p. 331, 463, tab. 17. (*Pharmaceutical Journal*, vol. vii. p. 179.) The appearance of the inspissated gum, which is imported from Borneo under that name, indicates a different source. Other Malay islands are said to afford *gutta percha*, but probably from yet other plants. This should be inquired into: the chemical characters of the juice in a fresh state should be ascertained, and compared with those of caoutchouc.

Green Tea.—Is indigo or any other vegetable die used to colour the green tea in the northern provinces of China? Specimens of the plant and dye so employed are desiderata. Is turmeric or any yellow vegetable dye used in conjunction with it, or with Prussian blue?

Japan Wax.—The true source of this wax.

Assafœtida.—From what species of *Ferula* is this extracted, and how? Does the same species yield the *Tear assafœtida* and the *lump*? Specimens of the one or several assafœtida plants should be procured, with the gum-resin produced by each species.

Patchaouli, or *Puchá Pát*.—A well known perfume, of comparatively recent introduction to Europe. It is referred to a plant now described by botanists under the name of *Pogostemon Patchaouli*; but we are ignorant of the mode of its preparation and the exact locality where it is produced.

Sago of Japan.—Is it from a *Cycas*, and what species? Also specimens of sago in different stages of manufacture, with the trees yielding them, from the various parts of the Indian Archipelago; so that we may identify the particular kinds of sago yielded by the several sago-palms. Is the Ceylon sago the granulated pith of the *talipot-palm* (*Corypha umbraculifera*?)

Korarima.—A large kind of cardamom, or aromatic

fruit (an *Amomum*?) found in the markets of Shoa, but probably the produce of a country farther to the west.

Scammony.—Particulars of the manufacture—or, to speak more correctly—the adulteration of scammony, carried on at Smyrna. What is the purgative resin or gum-resin (if any) which is added, with the view of increasing the bulk and the medicinal activity of the mixture?

Camphor Oils.—There are two sorts: one brought from the East, does not deposit crystals by keeping; the other does. Is the former the produce of *Dryobalanops Camphora*? If so, what is the source of the latter? Is it obtained from the foliage of *Laurus Camphora* (*Camphora Officinarum*, Nees,) or is it an artificially manufactured article? The camphor deposited is said to be similar to common camphor.

Kino.—All particulars of details about the manufacture of East Indian kino (*Pterocarpus marsupium*) are desirable.

Turmeric.—The several commercial sorts of turmeric differ so much in external character as to throw doubt on the identity of their origin. Are they not the produce of several species of *Curcuma*? Well dried specimens accompanying the root, should be transmitted from different parts of India.

The Grass-Oils.—The grasses used in India for affording the oils imported as grass-oils, lemon-grass-oil, and essence of verbena, or verbena-oil, to be ascertained, and samples sent home, with details of the manufacture.

Storax of commerce is supposed to be obtained from the *Liquidambar orientale* of Cyprus, and comes by the Red Sea from the Persian Gulf: but the subject requires investigation, for others believe the plant grows in Cobross, an island of the upper end of the Red Sea. Dr. Pereira has ascertained that the *liquid storax* comes to us by way of Trieste; the storax of the Indian Archipelago is yielded by the *Liquidambar altingia* of Blume.

Adelaide Resin.—What is the source of the red resin from the colony of South Australia?

(*N. B.* The various gums yielded by many trees and barks affording tannin in Australia require careful investigation.)

Is the true *cinnamon* of Ceylon the production of one species, or are other kinds employed? What occasions the red color of the oil of cinnamon from Ceylon?

Tucamahaca of Ceylon.—Specimens obtained from *Calophyllum inophyllum* are desirable in order to aid pharmacologists in accurately determining the *Tacamahaca* of European commerce.

Ceylon (Long or Wild) Cardamom.—What is the plant so called in Ceylon, and named by Mr. Moon *Alpinia Granum Paradisæ*? Can it be identical with the true *Grains of Paradise* of the western coast of Africa?

Rice paper of China.—This has been incorrectly referred to the Shola (*Æschynomene asperata*;) but we are still quite ignorant of the origin of this familiar and exquisitely delicate substance. It is the pith of some plant, but what? —*Pharm. Journal, Dec. and Jan.*

ART. XXXVIII.—PROGRAMME OF PRIZE PROPOSED BY THE
SOCIETY OF PHARMACY OF PARIS.

It has long been an important question with pharmacists how to obtain a substitute for sulphate of quinia possessed of the same therapeutic effects, or how to reduce the price of its production so as to permit its employment in all the numerous cases in which its use is indicated.

This question has been examined in its different phases in numerous publications; it would be useless to enter more at large upon the advantages which attach to its solution.

The Society of Pharmacy have thought that the problem

could be attacked directly with some chance of success, and that in the actual state of science, it is not impossible to accomplish the direct formation of the sulphate of quinia. They have therefore resolved to make an appeal to chemists on this subject, in the hope that it will be duly responded to.

A few years since it would have been thought an act of temerity to demand of chemists a process by which to produce, directly from inorganic elements, a substance which is a product only of organic life. But, in her progressive march, science has discovered that certain substances, which are ordinarily the products of living tissues, may be formed directly and independently of these.

Thus urea, to cite a common example, it is universally admitted, may be produced, with carbon, hydrogen, oxygen and nitrogen; and the time is not far distant, it is thought, when the general problem shall be solved, and any organic compound of known composition can be reproduced from the inorganic elements which compose it, either by imitating a synthetic process of nature, as yet unknown, or by the employment of means which the chemist already employs, as for instance in the preparation of artificial urea.

As regards the organic alkalies, a great number are already known, and among these are many which are exclusively artificial products.

The various modes of preparing this species of compounds, are so well understood, that it is as easy to obtain a new alkaloid as to prepare an acid, alcohol or ether. Many organic alkalies besides that of the urine, have been artificially obtained, and it is not the first time that chemists have published the opinion, that the alkaloids of cinchona and opium could be prepared artificially. MM. Dumas, Gerhardt, Kopp and others, have heretofore expressed such an expectation. By the remarkable work of M. Wurtz, the existence of a great

number of artificial alkaloids is made known, all of which are derived from ammonia, and expressed by the formula $-(A^z H^3) (C^m H^{m-6})$ that is to say, ammonia and carbo-hydrogen. Each of these alkaloids thus constitute one end of a series, of which the carbo-hydrogen is the initial, or in other words, the carbo-hydrogen being given, may be formed by combination with ammonia into an alkaloid, just as we obtain from one compound radical, an alcohol, an aldehyde, an acid, an ether, &c., according as it is combined with variable equivalents of water and of oxygen.

The principal processes as yet adopted for obtaining the alkaloids, are the following :—

1st. The decomposition of certain ammoniacal compounds, as urea, by the decomposition of cyanide of ammonia. Furfuran from furfuramide. Amarin from hydrobenzamide. Melamin from sulpho-cyanuret of potassium.

2d. By the reduction of certain nitrogenized compounds, by sulphuretted hydrogen, or by hydro-sulphate of ammonia.

Anilin is thus obtained from nitro-benzide. Toludin by the reduction of nitro-benzoën. Cuminin also from nitro-cumèn.

3d. By the distillation of certain organic matters under the influence of potassa; they are :

Quinolein, produced by the action of potassa on quinia, cinchonia and strychnia. Anilin, by the action of potassa on isatin. Conicin, by the action of potassa on the unknown principle of hemlock. Nicotin, by the action of potassa on nicotianin from tobacco. Valéramin or amyli-aque, produced by the action of potassa on cyanate of amyène.

4th. The dry distillation of certain products. The distillation of coal furnishes anilin, designated under the name kyanole. Quinaléin, designated as leucol, pyrrhol, picolin, &c.

5th. Some alkaloids are obtained by the desulphuration of certain essences or sulphuretted alkaloids. Thus sinamin and sinapolin are obtained from essence of mustard.

6th. In fine, it is possible by submitting the alkaloids as found in nature to certain reactions, to obtain a great number of other products possessing equally alkaline properties. To this class belong especially, all the products obtained by substituting chlorine, bromine, iodine, &c. for one or more equivalents of hydrogen in the compound.

Influenced by these considerations, the Society of Pharmacy of Paris, propose a prize of 4000 francs for the chemist who shall discover the means of preparing Quinia, artificially, that is to say, without employing in its preparation, either cinchona bark or other organic matter containing quinia ready formed.

In case this desideratum shall not be attained, the prize will be awarded to the author of the best work making known a new organic product, natural or artificial, having therapeutical properties equivalent to those of quinia, and which it will be possible to substitute for it in commerce.

The essays to be addressed to the Secretary General of the Society before the 1st of January, 1851.

Candidates who desire to keep their processes secret may envelop, under seal, the descriptions which are not designed to be made public. On the demand of such an one, the commission will designate one of its members, who will take the sole cognizance of the proceedings; he will attend its execution in his presence. Verbal description of the operations shall be heard, and placed under seal in the hands of the General Secretary of the Society. The commission will maintain the opinion of its delegate.

In all cases the specimens of products obtained should be presented to the Commission and to the Society to be submitted to experiment, if judged desirable. The total quantity of the specimen should not be less than 250 grammes.

Signed,—Hottot, Guibourt, Boüchardat, Gaultier de Claubry, Buignet, and Bussy, reporters.—*Journal de Pharmacie*.

ART. XXXIX.—ON THE EXPLOSION OF BURNING FLUIDS.

By E. N. HORSFORD.

Rumford Professor in the University of Cambridge, U. S. A.

It has been maintained that several of the various preparations under the general denomination of *burning fluids* are, in certain conditions, explosive. It has been asserted by vendors, on the other hand, that they are not explosive. Wherein the misapprehension lies, how the numerous accidents that have occurred in the use of burning fluids are to be explained, and by what precautions the repetition of these accidents may be prevented, have been subjects of experimental inquiry.

a. The *burning fluids*, as a class, are rectified spirits of turpentine, or turpentine with an admixture of a small percentage of highly rectified spirits of wine, or of some other inflammable body readily soluble in turpentine or alcohol. *b.* Turpentine, alcohol and ether, when fired in an open vessel, burn at the surface so long as a supply of oxygen is kept up. *c.* A slight report attends the flash of flame at the commencement of the combustion. *d.* The accidents with burning fluids have ordinarily occurred during the filling of lamps from the cans, and always in the presence of flame, from a burning lamp or other source.

In these facts (*a, b, c, d,*) lies the explanation of the phenomena that have been observed.

It is well known that a mixture of hydrogen and oxygen in the proportion of 2 vols. of the former to 1 of the latter is eminently explosive: and that atmospheric air in larger measure may be substituted for oxygen with somewhat

diminished explosive tendency of the mixture. An admixture of oxygen with the hydrocarbon used for city illumination is explosive. Atmospheric air may be substituted for oxygen, as in the case above, with the like effect.

The above considerations suggested the idea, that in the chamber over the burning fluid, in the flask or can from which the lamps are filled, there might be an admixture of the vapor of the burning fluid in such proportion with atmospheric air as to make it susceptible of explosion. To test the value of this suggestion, experiments were made with alcohol, ether, and a kind of burning fluid in general use:—

Experiment 1.—A current of air was directed into the upper part of a loosely-stoppered half-filled laboratory glass spirit-lamp while burning, causing thereby a mixture of alcohol, vapour and air to rush past the flame. After a moment or two the jet took fire, and was instantaneously followed by explosion. This result was uniform.

*Experiment 2.**—After permitting a drop of alcohol, in a large glass flask with a small neck, to evaporate for an instant, upon applying flame to the mouth, explosion resulted frequently, though not so uniformly as in Experiment 1.

Experiment 3.—Ether, similarly treated in a glass flask, yielded less uniform results, because probably of the greater difficulty of obtaining the proper mixture of ether and air.

Experiment 4.—A kind of *burning fluid*, in extensive use, and said by the vendors to be *not explosive*, was subjected to similar experiment, with still less frequent affirmative results. They were sufficient however to show that explosions with it are possible. Similar experiments have been made with another variety of burning fluid by Dr. Morrill Wyman of this city (Cambridge,) with like results.

It is therefore established, that when the proper amounts of burning fluid, vapor and atmospheric air are mixed together, as they may be, in the upper part of a partially filled can or receiver, and a flame is brought sufficiently

near, explosion must result. If the quantity of mixed gases be large, the explosion may cause the destruction of the containing vessel; or, if that remain entire, it may drive out a portion of the fluid, which, taking fire, may cause more or less injury.

The course of safety has been pointed out by the dealers in these articles for illumination. It is, to fill the lamps (the tops of which are without special air-holes, and which screw on) in the *absence of flame*, by daylight for example; in which case no explosion can occur.

Accidents similar to those with burning fluids have taken place in the use of the so-called air-tight stoves for burning wood. After the wood has been fired, and the supply of air for some time shut off, on reopening the draft (and sometimes without, there is reason to believe) occasional explosions of great violence have occurred, attended sometimes with the partial destruction of the stove. The probable explanation is the following.

After firing the wood and shutting off the draft, destructive distillation commences. Inflammable gases issue from the wood, which, mingling with air derived from the pipe or remaining still unconsumed, furnish a mixture becoming more and more explosive, until at length the proper proportions having been obtained, the incandescent coal or a jet of flame causes explosion.

As these accidents are not of frequent occurrence, it may be found that the probability of producing inflammable gases in the required quantity is less with some varieties of wood than with others.—*Chemical Gazette*, Feb. 1, 1850.

ART. XL.—NEW PROCESS FOR EXTRACTING SUGAR FROM THE SUGAR CANE.

BY M. MELSSENS.

The following account of the new and important method of extracting sugar from the sugar-cane, is abridged from the first of two long articles recently published in the *Cour. de l'Europe*.

The great difficulty which has been experienced up to the present time in the preparation of sugar, has been owing to the rapidity with which it, when dissolved in water, alters by exposure to the air in hot climates. It must, however, be clear, since the cells of the sugar-cane are themselves full of sugar dissolved in water, and this solution can be kept for a long time in them, without undergoing any alteration at all, that if the same conditions which exist in nature could only be obtained in practice, there is no reason why an artificial solution of sugar may not be kept unaltered for a considerable space of time; or in other words, why water should not be used for the purpose of dissolving the sugar out of the crude juice expressed from the cane.

The difficulties, indeed, are not owing to the sugar or to the water, but to the air, and the ferments produced by its action on the crude sap of the sugar-cane. The object of M. Melsens was, then, to exclude the air from the sap when extracted from the cane, and to prevent the formation of any ferments which might change the character of the saccharine matter. This he has succeeded in doing by availing himself of the well-known affinity of sulphurous acid for oxygen gas. Sulphurous acid, however, alone was found not to answer the purpose; the sulphuric acid, produced by the absorption of oxygen by sulphurous acid, acting on the sugar, converts it into grape sugar. This difficulty has been overcome by using sulphurous acid combined with a powerful base, which, as the sulphurous acid

is converted into sulphuric acid, combines with the latter and forms an insoluble salt.

The acid sulphites, and more especially the bisulphite of lime, were employed by M. Melsens for the double purpose of preventing fermentation by the action of the sulphurous acid, and of neutralising the sulphuric acid as fast as it formed by means of the lime.

Sugar candy dissolved in cold water containing bisulphite of lime, even in excess, crystallized entirely, and without undergoing any change, by spontaneous evaporation, at a low temperature. Several other experiments of the same nature, but differing in their details, always gave the same result; in each the sugar crystallized out by spontaneous evaporation, without any loss either in quantity or in quality, and without any appearance of molasses. In these experiments, the sugar dissolved in water, containing bisulphite of lime in excess, was boiled, and then left to evaporate, sometimes after being filtered, sometimes without any filtration at all.

From the experiments which M. Melsens has made with bisulphite of lime, it is probable that if a cold solution of this salt were to be poured on the sugar cane grinder, so as to mix with the juice the moment that it is expressed from the cane, the sugar might be kept for some time, and might be exposed to the heat necessary for its clarification without any sensible loss or deterioration.

But this same salt also possesses the property of coagulating, at a temperature of 212° , milk, white of egg, blood, yolk of egg mixed with water. At a temperature of 212° , bisulphite of lime acts as a clarifier. It separates the albumen, caseum, and other similar azotized matters which are found in the sugar cane. This separation is affected without appreciable loss in the quantity, or deterioration in the quality, of the sugar.

Bisulphite of lime, moreover, rapidly and tolerably effectually bleaches the colored substances found in the sugar

cane; it prevents the formation of other colored matters produced by the action of air on the pulp of the cane; it also stops the production of those which are formed during evaporation, and above all of those which require for their developement the joint action of air and a free alkali.

It seems that colored substances, which, under ordinary circumstances, are formed spontaneously by the exposure of the pulp of the sugar cane to the air, never make their appearance when bisulphite of lime is employed. By evaporating, at a low temperature, bisulphite of lime mixed with—1, a common solution of sugar; 2, the crude sap of the sugar cane; 3, the juice of beet root; no coloration was produced. By an evaporation of the same substances at a high temperature, the coloration was scarcely visible; indeed, with red beet root the color was completely destroyed, and the sugar obtained was perfectly white.

It seems, then, that bisulphite of lime can be employed in the extraction of sugar:—1st, as an antiseptic, preventing the production and action of any ferment; 2nd, as a substance greedy of oxygen, opposing any alteration that might be caused by its action on the juice; 3, as a clarifier coagulating at a temperature of 212° all albuminous and other coagulable matters; 4th, as a body bleaching all pre-existing colored products; 5th, as a body opposing itself in a very high degree to the formation of colored substances; 6th, as a base capable of neutralising any hurtful acids which might exist or be formed in the juice, and substituting in their place a weak inactive acid, namely, sulphurous acid.

M. Melsens is of opinion that sugar can be obtained from the sugar cane with no other source of heat than a tropical sun, excepting only for the purpose of clarification; indeed, the bisulphite of lime prevents the crude juice of the cane, or the syrup obtained therefrom, from undergoing any changes; great rapidity in the process of crystallization, indispensable at present, becomes by using this salt unneces-

sary ; and more than this, the quantity of sugar now lost in the bagasse, in consequence of the impossibility of washing it out unchanged, can be all collected by being dissolved in water charged with bisulphite of lime.

The only objection that can be made to the above process is, that the sugar obtained by means of bisulphite of lime has a sulphurous taste ; this is true, but the taste is completely lost—1st, by crushing the sugar and exposing it to the air, whereby the little sulphite of lime which there may be is converted into a tasteless sulphate ; 2d, by exposing the sugar to an atmosphere containing ammonia ; if this is done the sugar acquires a very agreeable flavor of vanilla, but is apt to become a little discolored ; 3d, by clarifying it until it loses 10 per cent. of its weight ; by this process a pure white sugar can be obtained, which will bear comparison with any sample produced at present. The last is the process recommended to be used on a large scale. The quantity of sugar which can be obtained from the sugar cane by adopting bisulphite of lime, as above recommended, is at least double that obtained by the usual processes.

In consequence of M. Melsens having made all his experiments on the sugar cane at Paris, and therefore on a small scale, he is not able to state how bisulphite of lime can be best used in the large colonial sugar manufactories, but is compelled to leave the application of the principles on which his method depends to the intelligence of the manufacturers themselves.

In the preparation of beet root sugar bisulphite of lime is quite as useful as in the extraction of cane sugar ; the way in which it is to be employed in the former is fully explained in the second article published in the 507th number of the *Courier de l' Europe*, to which we must refer those among our readers who desire any further information on the subject.—*Chemical Gazette*, January 15, 1850, from *Gard. Chron.* December 15, 1849.

ART. XLI.—PATENT GRANTED TO ROBERT OXLAND AND JOHN OXLAND FOR IMPROVEMENTS IN THE MANUFACTURE OF SUGAR.

These improvements in the manufacture of sugar consist in the employment of the acetate of alumina for defecating cane and beet-root juice, and of both defecating and removing the color from the solutions of raw sugar produced in the operation of sugar refining.

The process for sugar refining is conducted in the following manner:—The raw sugar may be blown up in the usual manner, but it is preferred to dissolve the sugar in water, with the aid of heat from steam, passing through a flat coil of pipe, into an outer jacket surrounding the pan, and then carbonate of lime, in fine powder, should be mixed with the syrup, until all acidity should be neutralized, and the solution should be made to boil at a temperature of 220° Fahrenheit. The syrup should then be run into the ordinary filter bags, and when running bright from them, it should be turned into another but more shallow blow-up pan, fitted in the same manner before described. Acetate of alumina is now to be mixed with the syrup, and the whole boiled together at a temperature of 220°, until the greater portion of the acetic acid has been evolved, which may be ascertained by testing the steam passing off from the syrup with blue litmus paper. A steam-tight cover and pipe, fitted to a condensing apparatus, may be employed to save the acetic acid evolved, which may be used for the preparation of further quantities of acetate of alumina.—When nearly the whole of the acetic acid has been evolved, small quantities of a solution of tannin in water are stirred in until no further precipitation is produced thereby. The process is completed by the addition of carbonate of lime, in fine powder, in sufficient quantity to neutralize all acidity. The syrup is then passed through bag filters, and as soon as it runs bright, it is turned into the reservoir from

which the vacuum-pan is supplied. It has been found that one filtration through the bags is sufficient, provided a larger quantity of acetate of alumina be employed, and a fine copper sieve be interposed between the liquor running down from the blow-up pan and the head of the bag-filters.

The boiling of the vacuum-pan is conducted in the usual manner, as are also the whole of the subsequent operations. In the preparation of fine liquor, to be employed subsequently to what is termed the claying operation, it has been found desirable to use a small quantity of alumina, heating the syrup to which it has been added to 212° Fahr. for a few minutes, then adding sufficient of the solution of tannin, to precipitate the last traces of alumina, and of carbonate of lime, to neutralize acidity; and finally, passing through filter-bags. Cane and beet-root juice are treated with the acetate of alumina and solution of tannin for defecation, either before the neutralization by lime and concentration by heat, or subsequently, when the juice has been concentrated to from 20° to 28° Baumé.

The acetate of alumina is prepared in the following manner: Sulphate of ammonia is dissolved in cold water, added a clear solution of soda-ash, also made in cold water, added to it, until an alkaline reaction is produced on reddened litmus paper. The liquor is allowed to stand until the alumina is precipitated, the clear liquor then drawn off, and the precipitate washed with a fresh quantity of water, which is again removed, and the washing repeated until the hydrometer no longer indicates the presence of any soluble matter.

The precipitate is taken with as little water as may be, and acetic acid added in successive quantities, until the whole or nearly all of the alumina is dissolved, avoiding an access of acid. The acetate of alumina acts best when recently prepared.

The solution of tannin is prepared by digesting one pound of crushed valonia in two gallons of hot water, using the

clear liquor ; but it may be prepared by other means. As different sugars differ in their qualities, no exact rule can be given as to the quantity of acetate of alumina to be used ; but the operator will readily ascertain the quantity required in each case, by taking a sample of the juice or sugar, and testing it with a measured quantity of acetate of alumina. The patentees have found that the best effect is produced on a fair sample of Jamaica sugar, by employing at the rate of four pounds of alumina, dissolved in acetic water, to one ton of sugar.—*Chem. Gaz.*, Nov. 16th, 1849.

ART. XLII.—ON THE DIFFUSION OF LIQUIDS.

BY PROFESSOR GRAHAM.

[Abstract of the Bakerian Lecture, delivered before the Royal Society,
21st December, 1849.]

The Lecturer commenced by observing, that a salt or other soluble substance once liquified and in a state of solution, is evidently spread or diffused uniformly through the mass of the solvent by a spontaneous process. It has often been asked whether this process is of the nature of the diffusion of gases, but no satisfactory answer to the question appears to be obtained, owing, he believed, to the subject having been studied chiefly in the operations of endosmosis, where the action of diffusion is complicated and obscured by the imbibing power of the membrane, which appears to be peculiar for each soluble substance, but not necessarily connected with the diffusibility of the substance in water. Gay Lussac proceeded upon the assumed analogy of gaseous and liquid diffusion in the remarkable explanation which he suggested of the cold produced on diluting certain saline solutions, namely, that the molecules of the salt expand into the water like compressed gas admitted into additional space. The phenomena of solubility were at the same time con-

sidered by that acute philosopher as radically different from those of chemical affinity, and as the result of an attraction which is of a physical or mechanical kind. The characters indeed of these two attractions are strongly contrasted.—Chemical combination is uniformly attended with the evolution of heat, while solution is marked with equal constancy by the production of cold. The substances which combine chemically are the dissimilar, while the soluble substance and its solvent are the like or analogous in composition and properties.

It was further premised, that two views may be taken of the physical agency by which gaseous diffusion itself is effected, which are equally tenable, being both entirely sufficient to explain the phenomena. On one theory, that of Dr. Dalton, the diffusibility of a gas is referred immediately to its elasticity. The same spring or self repulsion of its particles, which sends a gas into a vacuum, is supposed to propel it through and among the particles of a different gas. In the other theory, the existence of an attraction of the particles of one gas for the particles of other gases is assumed. This attraction does not occasion any diminution of volume of gases on mixing, because it is an attraction residing on the surfaces of the gaseous molecules. It is of the same intensity for all gases; hence its effect in bringing about intermixture is dependent upon the weight of the molecules of the gases to be moved by it, and the velocity of diffusion of a gas comes to have the same relation to its density on this hypothesis as upon the other. The surface attraction of molecules assumed, will recall the surface attraction of liquids which is found necessary to account for the elevation of liquids in tubes, and other phenomena of capillary attraction.

The apparatus used in studying the diffusion of salts and other substances into water was very simple. It consisted of an open phial, to contain the solution of the salt to be diffused, which was entirely immersed in a large jar of pure

water, so that the solution in the phial communicated freely with the latter. Phials cast in a mould of the capacity of four ounces of water, or more nearly 2,000 grains, were generally employed, which were ground down to a uniform height of 3.8 inches. The neck was 0.5 inch in depth, and the aperture or mouth of the phial 1.25 inch in diameter. The phial was filled up with the solution to be diffused till it reached the point of a pin, dipping exactly 0.5 inch into the mouth of the bottle. This being the solution cell or bottle, and the external jar the "water jar," the pair together form a "diffusion cell." The diffusion was stopped generally after seven or eight days, by closing the mouth of the phial with a plate of glass, and then raising it out of the water jar. The quantity of salt which had found its way into the water jar—the diffusion product as it was called—was then determined by evaporating to dryness.

The characters of liquid diffusion were first examined in detail with reference to common salt.

It was found, first, that with solutions containing 1, 2, 3, and 4 per cent. of salt, the quantities which diffused out of the phials into the water of the jars, and were obtained by evaporating the latter, in a constant period of eight days, were as nearly in proportion to these numbers, as 1, 1.99, 3.01, and 4.00; and that in repetitions of the experiments, the results did not vary more than 1-40th part. The proportion of salt which diffused out in such experiments amounted to about 1-8th of the whole.

Secondly, that the proportion of the salt diffused increases with the temperature; an elevation of 80° Fahr. doubling the quantity of chloride of sodium diffused in the same time.

The diffusibility of a variety of substances was next compared, a solution of 20 parts of the substance in 100 water being always used. Some of the results were as follows, the quantities diffused being expressed in grains:—Chloride of sodium 58.68, sulphate of magnesia 27.42, sulphate of

water 69.32, crystallised cane sugar 26.74, starch sugar 26.94, gum arabic 13.24, albumen 3.03. The low diffusibility of albumen is very remarkable, and the value of this property in retaining the serous fluids within the blood-vessels at once suggests itself. It was further observed, that common salt, sugar, and urea, added to the albumen under diffusion, diffused away from the latter as readily as from their aqueous solutions, leaving the albumen behind in the phial. Urea itself is as highly diffusible as chloride of sodium.

In comparing the diffusion of salts dissolved in ten times their weight of water, it was found that isomorphous compounds generally had an equal diffusibility, chloride of potassium corresponding with the chloride of ammonium, nitrate of potash with nitrate of ammonia, and sulphate of magnesia with sulphate of zinc. The most remarkable circumstance is, that these pairs are "equi-diffusive," not for chemically equivalent quantities, but for equal weights simply. The acids differed greatly in diffusibility, nitric acid being nearly four times more diffusive than phosphoric acid; but these substances also fell into groups, nitric and hydrochloric acids appearing to be equally diffusive; so also acetic and sulphuric acids. Soluble subsalts and the ammoniated salts of the metals present a surprisingly low diffusibility. The quantities diffused in similar circumstances of the three salts, sulphate of ammonia, sulphate of copper, and the blue ammonia sulphate of copper being very nearly as 8, 4, and 1.

When two salts are mixed in the solution cell, they diffuse out into the water atmosphere separately and independently of each other according to their individual diffusibilities. This is quite analogous to what happens when mixed gases are diffused into air. An important consequence is, that in liquid diffusion we have a new method of separation or analysis for many soluble bodies, quite analogous in principle to the separation of unequally volatile substances in the

process of distillation. Thus it was shown that chlorides diffuse out from sulphates and carbonates, and salts of potash from salts of soda; and that from sea-water the salts of soda diffuse out into pure water faster than the salts of magnesia. The latter circumstance was applied to explain the discordant results which have been obtained by different chemists in the analysis of the water of the Dead Sea, taken near the surface; the different salts diffusing up, with unequal velocity, into the sheet of fresh water, with which the lake is periodically covered during the wet season.

It was further shown that chemical decompositions may be produced by liquid diffusion. The constituents of a double salt of so much stability as common alum being separated; and the sulphate of potash diffusing in the largest proportion. In fact, the diffusive force is one of great energy, and quite as capable of breaking up compounds as the unequal volatility of their constituents. Many empirical operations in the chemical arts, it was said, have their foundation in such decompositions.

Again, one salt, such as nitrate of potash, will diffuse into a solution of another salt, such as nitrate of ammonia, as rapidly as into pure water; the salts appearing mutually diffusible, as gases are known to be.

Lastly, the diffusibilities of the salts into water, like those of the gases into air, appear to be connected by simple numerical relations. These relations are best observed when dilute solutions of the salts are diffused from the solution cell, such as 4, 2, or even 1 per cent. of salt. The quantities diffused in the same period of seven days from 4 per cent. solutions of the three salts, carbonate of potash, sulphate of potash, and sulphate of ammonia, were 10.25 grains, 10.57 and 10.51 grains respectively; and a similar approach to equality was observed in the 2, 4, and 6 per cent. solutions of the same salts. It also held at different temperatures. The acetate of potash appeared to coincide in diffusibility with the same group, and so did the ferrocyanide of

potassium. The nitrate of potash, chlorate of potash, nitrate of ammonia, chloride of potassium, and chloride of ammonium formed another equi-diffusive group. The times in which an equal amount of diffusion took place in these two groups appeared to be as 1 for the second to 1.4142 for the first, or as 1 to the square root of 2. Now, in gases, the *squares of the times* of equal diffusion are the *densities of the gases*. The relation between the sulphate of potash and nitrate of potash groups would therefore fall to be referred to the diffusion molecule and diffusion vapor of the first group having a density represented by 2, while that of the second group is represented by 1. These were named the *solution densities* of the salts in question. The corresponding salts of soda appeared to fall into a nitrate and sulphate group also, which have the same relation to each other as the potash salts. The relation of the salts of potash to those of soda in times of equal diffusibility appeared to be as the square root of 2 to the square root of 3; which gives to them solution densities of 2 and 3. Hydrate of potash and sulphate of magnesia were less fully examined; but the first presented sensibly double the diffusibility of sulphate of potash, and four times the diffusibility of the sulphate of magnesia. If these times are all squared, the following remarkable ratios are obtained for the solution densities of these different salts, each of which is the type of a class of salts: hydrate of potash 1, nitrate of potash 2, sulphate of potash 4, sulphate of magnesia 16, with nitrate of soda 3, and sulphate of soda 6. In conclusion, it was observed that it is the diffusion molecules of the salts, having such densities, which are concerned in solubility; and not the Daltonian atoms or equivalents of chemical combination; and the application was indicated of a knowledge of the diffusibilities of different substances to the study of endosmose, in which the proper function of the membrane would be distinguished from that of the salt.—*Pharm. Jour.* Feb. 1850.

ART. XLIII.—ON THE VANILLA OF THE ISLAND OF BOURBON.

BY M. BOUCHARDAT.

The greater portion of the vanilla we receive comes from the maritime countries of Mexico ; it also grows on the banks of creeks shaded by the mangoes, which are sometimes under water at high tide ; also in Colombia, and in Guiana. Attempts have been made to cultivate it at Cayenne, St. Domingo, and the Isle of France. These efforts have also been followed in the Island of Bourbon. M. Menier has lately received two boxes of vanilla from this colony, and has forwarded a specimen of it to me, which gave rise to the following investigations on the subject.

The *vanilla of the Island of Bourbon* is certainly produced by the same plant as that of Mexico ; the husks present the same general characters ; they are from six to seven inches long, shrivelled, furrowed longitudinally, narrowest at the two extremities, and bent at the base. These husks are rather soft, viscous, of a reddish brown color ; they possess in a considerable degree the characteristic odor of vanilla ; they readily become covered with the white crystalline efflorescence.

The vanilla of Bourbon only differs from that of Mexico in the following unimportant characters ; it is generally less plump, from one-third to two-thirds of an inch shorter, and rather thinner. Its color is redder, and not so brown ; it is drier and less unctuous. Above all, it is distinguished by the characters of the extremities, which dry up and contract, losing that flexibility so characteristic in the Mexican variety. These differences, which are very trifling, suffice to render the vanilla of Bourbon less valuable in a commercial point of view. I am of opinion that these differences arise partially from the mode of preparation or preservation of them ; for instance, in the manner of drying the husks, and in the coating of them with oil. In general

utility the vanilla of Bourbon is scarcely inferior to the best vanillas met with in commerce.

It has been long since stated, that on account of the high price of vanilla, its culture was worthy of attention. I shall presently show that the purposes to which this delightful aromatic may be applied are more important than is generally imagined. But the difficulties in its cultivation seem to be great, for in the different countries it has, as yet, not extended beyond experiments.

M. Morren has, nevertheless, in the greenhouses at Liege, cultivated some vanilla with success. He states that the plants he possesses have yielded vanilla to the value of 600 francs in one year. A single plant, about three yards high, cultivated in the greenhouse of the Museum in Paris, yielded, in 1840, 117 pods of vanilla, having a sweet odor, and ripened in about a twelvemonth.

The following are the principal difficulties relating to the cultivation of vanilla:—1. The proper choice of the species or best variety; 2. The necessity of having an elevated temperature; 3. The determination as to the most favorable conditions for the development of this plant; 4. A good mode of preparing the pods.

The species or variety producing the best commercial vanilla is not yet determined. The *Vanilla aromatica* of Swartz, figured by Plummier, and ascribed by Linnæus to the *Epidendrum vanilla*, does not appear to be the vanilla of commerce. Indeed, Plummier states that his plant, which is from St. Domingo, is without odor, the fruit small, thin, and cylindrical; thus does not resemble the true vanilla. On the other hand, MM. Splitgerber and Morren assert that the long vanilla of commerce is furnished by the *Vanilla planifolia*. That which makes the latter appear to be the most probable opinion is, that the same species, cultivated in the houses of Liege and Paris, *artificially produced by the pollen of another species*, has produced pods equal to those of the best commercial vanilla. Thus

we see it has yet to be determined which is the best species or variety to cultivate.

The cultivation of vanilla in France must, necessarily, be limited, on account of its requiring an elevated temperature, such as that of a greenhouse, which ought to be of a large size and airy. From this cause its cultivation is not likely to be attended with any profitable pecuniary results, unless under peculiar circumstances. The most favorable conditions for the development and fructification of the vanilla are far from being determined. The difficulties attendant on the cultivation of the orchidacea are well known, and that of the vanilla appears to be more so than others of the same family. Its stems are provided with adventitious roots, which implant themselves in the bark of the mangoes, and it is periodically watered by the high tides. Does not the vanilla require this or a similar tree favorable to parasitic growth? And are not the salts of the sea equally favorable to the development of the mangoes, and consequently to the vanilla itself?

In the Island of Bourbon, and in Guiana, the principal requisites we have named may be obtained. I think, therefore, the cultivation of vanilla would be regular and certain, and the increased consumption of it would speedily follow its production.

I will now refer to the question of increased consumption. I perfectly agree in the opinion of MM. Méral et de Lens, who say (*Dictionnaire de Matière Médicale*, t. 6, p. 852,) that "the vanilla, if used in many of our aliments, would give to them an agreeable and delicate flavor, rendering them more serviceable in derangements of the digestive functions." It may also be added that vanilla contains a balsamic oil, possessing the valuable properties (which M. Deschamps has discovered in the poplar and in benzoin,) of counteracting the rancidity in fatty bodies. We may thus easily understand the twofold utility of vanilla in the manufacture of chocolate. In taking into consideration the

delicious flavor of this aromatic, we see to what great extent it might be used in the preparation of fatty aliments, if its price was moderate and certain. The sweetness of its perfume is a great recommendation to its employment by chemists, for the purpose of counteracting the rancidity of pomades.—*Pharmaceutical Journal for December, from Journal de Pharmacie.*

ART. XLIV.—ANALYSIS OF CALIFORNIAN GOLD.

By F. OSWALD.

This sample obtained from London consisted of small grains weighing respectively 48, 30, 24 and 18 grs., mixed with a fine ferruginous sand containing some iron spangles and a few particles of sulphuret of lead.

The gold itself had a very high color; a fine streak like the finest ducat gold; a dirty dull appearance, arising from brownish-red peroxide of iron, alumina, silica and calcareous sediment, which could be removed partially by digestion in sulphuric acid. The specific gravity of the pure pieces was 17.4. They consisted in 100 parts of—

T. H. Henry found			
Gold	87.6	Gold	88.75
Silver	8.7	Silver	8.88
<i>Residue consisting of—</i>			
Peroxide of iron	} 1.7	Copper and iron	0.85
Alumina		Siliceous residue	1.40
Lime	} 2.0		
Silica			
Moisture			
	100.0		

and a small loss.

The alloy of gold and silver which it contains consists consequently of—

T. H. Henry obtained

Gold	909.66	Gold	90.01
Silver	90.34	Silver	9.01
		Copper	0.86

and corresponds to an alloy of 21.48 carats. On comparing the author's analysis with that of Henry, it is evident that the Californian gold does not occur everywhere alike as regards the amount of silver; and that the accompanying constituents are not in all cases the same, but vary either with the nature of the soil, or with the greater or less care employed in the washing.—*Chemical Gazette*, January 15, 1850, from *Poggendorff's Annalen*, lxxviii. p. 96.

ART XLV.—ON THE SÉPARATION OF SOME ACIDS OF THE SERIES (CH) NO^4 .

BY PROF. J. LIEBIG.

In order to discover small quantities of butyric and valerianic acids in an acid mixture of the two, and to obtain the acids in a fit state for analysis, the following plan is most advantageous:—

A portion of the acid mixture is saturated with potash or soda, the remaining portion of the acid is added to the neutralized portion, and the whole subjected to distillation. Two cases now occur; if the valerianic acid in the mixture amount to more than is sufficient to neutralize the whole of the alkali, the residue contains no butyric acid, but pure valerianic acid. If the quantity of valerianic acid be less, a proportionate amount of butyric acid is left with the whole of the valerianic acid in the residue, but the distillate consists of pure butyric acid.

The quantity of the mixed acids which is neutralized

with alkali must be measured by the amount of the valerianic acid supposed to exist in the mixture; for instance, assuming 10 per cent. of valerianic acid, then one-tenth of the mixture is neutralized; but supposing it to be a valerianic acid containing 10 per cent. of butyric acid which it is wished to separate, then nine-tenths of the acid must be neutralized.

It is readily perceived that by a single operation one of the acids is always obtained pure. Either the distillate is pure butyric acid, and then the residue consists of a mixture of valerianic and butyric acids, or the distillate contains butyric and valerianic acids at the same time, and in this case the residue contains pure valerianic acid. By continuing the same treatment of the mixed residue or of the mixed distillate, *i. e.* partial saturation and distillation, it is possible to obtain from the residue another portion of one or other of the acids pure; and finally a perfect separation is effected, such as is scarcely possible by mere distillation of the acids.

As the boiling points of these two acids differ, it will be imagined that the soda, on combining with the least volatile of the acids, in this case the valerianic, deprives it of its volatility at the temperature at which the other boils. When, in a mixture of valerianic and butyric acids, the latter can naturally be distilled off in a pure state.

A mixture of valerianic with acetic acid, or of butyric with acetic acid, behaves in a totally different manner under the same circumstances. When such a mixture is partially neutralized with potash, and then submitted to distillation, it would be expected that acetic acid would principally pass over; such however is not the case, but the two other acids distil over, although the boiling point of acetic acid is more than 90° lower than that of butyric acid, and more than 126° lower than that of valerianic acid. This is owing to the formation of an acid acetate, which does not appear to be decomposed by either of the other two acids.

If valerianic acid is added to a solution of neutral acetate of potash, it instantly dissolves and in large quantity; in binacetate of potash the valerianic acid floats in oily drops upon the surface, and appears not to dissolve therein to a greater extent than in water. If a solution of neutral acetate of potash, to which an excess of valerianic acid has been added, is submitted to distillation, valerianic acid passes over, and the residue contains binacetate of potash together with valerianate of potash. If valerianic acid is added to binacetate of potash and the mixture distilled, valerianic acid passes over, and the binacetate is left in the retort free from valerianic acid. Butyric acid behaves precisely like valerianic acid. When therefore butyric or valerianic acid containing acetic acid is partially saturated with potash and distilled, either the whole of the acetic acid is left as an acid salt together with butyric acid, and in this case the acid which passes over is pure and free from acetic acid; or only acetic acid is left in the residue, and in this case the distillate still contains acetic acid, which can be separated from the butyric or valerianic acid by a similar operation.—*Chem. Gaz.*, January 15, 1850,² from *Liebig's Annalen*, Sept. 1849.

ART. XLVI.—ON THE OCCURRENCE OF FORMIC ACID IN STINGING NETTLES.

BY DR. GORUP-BESANEZ.

Some time ago, F. Will showed, by microchemical and microscopical experiments, that the fluid in the hairs of the so-called procession-caterpillar (*Bombyx processionaria*), which causes an inflammation of the skin, as well as the liquid in the poisonous organs of some insects, is nothing else than formic acid. It became highly probable therefore that formic acid would also occur in the vegetable kingdom already formed; and the first class of plants which was

thought of was that which, by means of stinging hairs or similar organs, produces an analogous effect to the sting of certain insects.

About a pound of the collected plants, *Urtica urens* and *dioica*, was cut small and pressed, and submitted to distillation with about four times the quantity of water and a few drops of concentrated sulphuric acid. The distillate was opalescent; a few oil-drops floated on its surface; it had a very offensive odor and a scarcely perceptible acid reaction. Mixed with carbonate of soda and evaporated to dryness in the water bath, it furnished a brownish mass, a very small portion of which was deliquescent, the greater consisting of the excess of carbonate of soda.

The mass was now very cautiously decomposed in a glass retort by the gradual addition of dilute sulphuric acid, when a distinctly acid distillate was obtained in the well-cooled receiver, which, neutralized with ammonia, gave all the reactions characteristic of formic acid. This experiment however did not appear to me to furnish a satisfactory proof of the presence of ready formed formic acid in the plant, as formic acid can be *produced* from the most different organic substances by concentrated sulphuric acid; and it was possible that in the present case the formic acid might have been produced by decomposition towards the end of the operation.

Five pounds of stinging nettles were therefore distilled with a corresponding quantity of water without any addition of sulphuric acid, and a product obtained perfectly similar to the one above mentioned. It was neutralized with carbonate of soda, evaporated to dryness, the residue decomposed with dilute sulphuric acid, and the acid distillate digested with carbonate of lime, in order to avoid the excess of carbonic acid and excess of alkali, which rendered the reactions very indistinct, and filtered. The yellowish solution, concentrated in the water-bath, proved to be formiate of lime. It reduced salts of silver and mercury, gave

with sulphuric acid the characteristic odor of formic acid, and with sulphuric acid and alcohol the still more characteristic smell of formic ether; oxalate of ammonia showed the presence of lime.

The amount of formic acid present in stinging nettles is certainly small; but this will not appear surprising, if we suppose that this acid is contained only in the stinging hairs, an assumption which is confirmed by the microscopic observations of Will and Lucus. When, for instance, solution of silver is added to the plant under the microscope, and a gentle heat applied, reduction always first occurs at the extremity of the stinging hair. *Chemical Gazette*, January 1, 1850, from *Journ. für Prakt. Chem.*, xlviii. p. 191.

ART. XLVII.—CONCENTRATED TINCTURE OF CAPSICUM, A REMEDY FOR CHILBLAINS AND TOOTHACHE.

BY A. TURNBULL, M. D.

At this season few diseases are so general as chilblains, and the plans that are generally employed for their removal are seldom attended with more than very slight advantage to the sufferers.

It is a disease that attacks most generally females and delicate children, and those of a languid circulation. The very numerous and various medicines which have been from time to time employed, prove very clearly that no very effective or successful plan of treatment has hitherto been found. Such is the present state of treatment both of chilblains and toothache.

My plan of treatment is simply to saturate a piece of sponge or flannel with the concentrated tincture of capsicum, and to rub well over the seat of the chilblains until such time as a strong tingling or electrical feeling is produced. This medicine possesses an extraordinary power in a

removing congestion by its action upon the nerves and circulation.

This application ought to be continued daily until the disease is removed; relief will be experienced on the very first application, and frequently there will be a total removal of the disease after the second or third. This of course depends upon the severity of the case. This embrocation when rubbed, never produces excoriation if the skin is not broken.

The manner of using it for toothache, is by putting a drop or two of the tincture on cotton, and applying it to the part affected—the relief will be immediate. The following is the formula:—

Tinctura Capsici Concentrata.

R Capsici Baccarum, ℥iv.

Spiritus Vini Rect., ℥xij.

Macera per dies septem et cola.

It may also be made with advantage by displacement.

[The fluid oleo resinous extract obtained by acting on capsicum with ether, and evaporating the ether, must possess yet stronger claims as a remedy in toothache, inasmuch as it is much stronger than capsicum weight for weight.—ED. AM. JOUR. PHARM.]

ABSTRACT FROM THE MINUTES OF THE PHILADELPHIA
COLLEGE OF PHARMACY.

At a Stated Meeting of the Philadelphia College of Pharmacy, held at their Hall, Third month 25th, 1850.

The Minutes of the last Stated and Adjourned Meetings were read and adopted.

The Minutes of the Board of Trustees were read by the Secretary. Since last meeting, the Degree of Graduate in Pharmacy has been conferred upon the following gentlemen, who have served a regular apprenticeship, attended two full courses of lectures, and passed a satisfactory examination before the Professors and Committee of the Trustees, viz:

Samuel C. Bunting,	Thesis on	Kernels of <i>Amygdalus Persica</i> .
Joseph Laidley,	"	Pharmaceutical Preparations.
Samuel E. Shinn,	"	Glycerin.
Charles S. Rand.	"	{ The relative positions of the Medical and Phamaceutical professions.
Benjamin B. Davis,	"	Tannic Acid.
Horace Conté,	"	The Cultivation of Coffee.
Isaac C. Jones,	"	{ The Pharmaceutical Treat- ment of <i>Cinchona</i> Barks.

The Committee appointed on the Adulteration of Drugs, in Third month, 1848, not being prepared to make a final report, are further continued.

The proposal to alter Section 4th of Law 5th, was again brought into view by reading the Report of the Committee, and on motion, the alteration was adopted as follows:

Law 5th Section 4th.

"Professional or scientific men residing at a distance from Philadelphia, may be elected Associate Members by the Board of Trustees, provided they are graduates of a respectable College of Pharmacy. Those who are not graduates in Pharmacy, if recommended by the Board as suitable candidates, may be elected Associate members by the College at any of its Meetings, by the unanimous vote of the members present. Each member so elected, to pay a contribution of twenty dollars, in lieu of all other contributions.

The Special Committee appointed at the last Meeting, on the Revision of the Pharmacopœia, &c., made a report which, on motion, was adopted and referred to the Committee on the Pharmacopœia, with instructions to report at the next meeting.

The Report of the Publishing Committee was read and accepted. In consideration of the valuable collection of facts contained in the pages of the Journal, the Committee have determined to publish a general Index, by which immediate reference may be had to any part of the twenty-one volumes which have already been published. This work will embrace about sixty pages double column, and will be issued in three

parts, with the three forthcoming numbers of the current volume, and will be distributed to subscribers gratuitously. The Committee believe it due to those who have long taken the work, while its presentation to the more recent patrons will, by exhibiting the interesting and useful character of the preceding volumes, induce them to complete their sets. *

During the past year, the Committee have expended in publishing and editing the Journal, seven hundred and ninety dollars and twenty-eight cents, and received from collections, including balance on hand at last report, eleven hundred and ninety-six dollars and fifty-five cents, leaving a balance in favor of the Publishing Committee of four hundred and six dollars and twenty-seven cents.

The Committee on Latin Labels report that since their appointment they have published and sold four editions of said Labels. A fifth edition of 1500 copies, including a complete set of Labels for Specimens of the Materia Medica, and 500 of copies specimen labels with the symbols, printed separately, has recently been published, and is now in course of sale. The profit arising from the sale of the labels has been used by direction of the College.

On motion it was Resolved, That the thanks of the College are eminently due to the Committee for their faithful discharge of the onerous duties which have been imposed upon them during the past fifteen years.

The Committee on the Sinking Fund report that they have been engaged in their duties during the past year, and have purchased two shares of Loan for one hundred and fifty dollars.

The committee on the Cabinet of Specimens report that they have had the necessary cases prepared and placed in the library ready for the specimens. That a part of the glassware has been procured and put in the cases, the balance having been ordered from the manufacturer, and may soon be expected. The committee propose to employ the labels, recently published by the committee on Latin labels, to designate the specimens

and they believe by the next meeting of the College they will be prepared to offer their final report. A number of the members of the college have agreed to contribute to the collection, from their stock, and there is every reason to suppose that the cabinet can be mainly filled without expense to the institution. When the receptacles shall be ready and the collection fairly under way, the committee would suggest that such a notice be given of it in our Journal as will inform the members and associates of the College of its existence, and invite contributions from these and others, of all rare, interesting and curious specimens in any way connected with Pharmacy. The committee believe that this cabinet may be the nucleus of a Pharmaceutical *Museum*, embracing natural specimens from the vegetable and mineral kingdoms, which with a fostering care from the College, through a suitable standing committee, will become respectable in its extent and exceedingly valuable as a depository to the Pharmaceutical student."

The Secretary introduced a letter which he had received from Dr. Caspar W. Pennock, of Delaware County, in which he informs that the "Scalpel," a medical Journal in New York, has advertised the public "that an agreement exists between the druggists and most of the physicians of Philadelphia, by which a percentage of the profits arising from compounding medical prescriptions is paid by the apothecaries to the physicians sending them said prescriptions," and that this statement had been republished in one or more of the public papers.

The communication elicited an indignant denial on the part of the members present of any participation in such arrangement, or of any positive knowledge of its existence. But as it was believed the Code of Ethics adopted by this College, which has been extensively published and circulated, was a sufficient answer to such a charge, it was concluded that further action on the subject at this time was unnecessary.

Joseph C. Turnpenny offered his resignation as Treasurer of the College, which on motion was accepted.

On motion, it was unanimously Resolved, that the thanks of

the College are due to our late Treasurer for the able manner in which he has discharged his duties for a period of ten years.

The College then proceeded to the annual election. The chairman appointed Thos. P. James and Charles Bullock, tellers who reported that the following members had received a majority of votes for the respective offices, and they were accordingly declared duly elected.

President,

Daniel B. Smith.

1st Vice President,

Charles Ellis.

2d Vice President,

Samuel F. Troth.

Secretary,

Dillwyn Parrish.

Treasurer,

Ambrose Smith,

Corresponding Secretary,

Joseph C. Turnpenny.

Trustees,

Warder Morris,

William Procter, Jr.,

Dr. Joseph Carson,

Dr. Robert Bridges,

John H. Ecky,

Edward Parrish,

William P. Troth.

Daniel S. Jones.

Publishing Committee,

Dr. Robert Bridges,

Edward Parrish,

Charles Ellis,

Alfred B. Taylor.

Committee on Sinking Fund,

Warder Morris.

Samuel F. Troth,

Joseph C. Turnpenny.

The former Treasurer is directed to hand over the books, and funds belonging to the College to Ambrose Smith, his successor in office.

Then on motion, adjourned.

DILLWYN PARRISH, Secretary.

Editorial Department.

By reference to the minutes at page 187, it will be observed that the attention of the College has been directed to a charge which appeared in a medical periodical, published in New York, called "The Scalpel," to the effect "that an *agreement exists between the druggists and most of the physicians* of Philadelphia, by which a per centage of the profits arising from compounding medical prescriptions is paid by the apothecaries to the physicians sending them said prescriptions."

What motive could have induced the writer of the above paragraph to cast so foul and sweeping an aspersion on the character of the physicians and pharmacutists of this city, we cannot divine; but that it is most unjust, and in the main untrue, we have no hesitation in asserting. That a few isolated instances exist here, as perhaps in all large cities and towns, where one or more physicians have an interest in a store, or who seek to add to their incomes by receiving a per centage on prescriptions directed to a particular store, may be true; but on examining into these cases, the professional standing of the parties has not been of a character to implicate either profession; indeed, we know of no city where so distinct a line of separation exists between the practitioners of medicine and pharmacy; in evidence of which it may be stated that the Philadelphia College of Physicians have, by resolution, declared that "any connection with, or monied interest in apothecaries stores on the part of physicians should be discountenanced;" and the Philadelphia College of Pharmacy have in like manner declared in their published *Code of Ethics*, "That an apothecary being engaged in furthering the interests of any particular physician to the prejudice of other reputable members of the medical profession, or allowing any physician a per centage or commission on his prescriptions, is unjust towards that profession, and injurious to the public."

We have no desire to attribute bad motives to the author of the aspersion in "the Scalpel," and are willing to place it to the account of wrong information; but we do decidedly object to the publication of such wholesale accusations, without any evidence of pains having been taken to ascertain their truth.

Whilst on this subject, we would express our utter disapprobation of the practice alluded to. A physician who asks an apothecary to give him a per centage, virtually asks him to overcharge his patients. It

does not end here: as he finds his income increased from this new source, it becomes a direct inducement to prescribe oftener, in larger quantities, and in more expensive forms; for we do not hesitate to believe, that any medical man who will so far wound his self respect as to propose such a source of revenue, will find no scruples beset him against the practice of over medication. On the other hand, an apothecary who will enter into such an agreement, must seek some means of compensation for the per centage paid to the physician, and the most natural source of this is a resort to over-charging his customers, either directly by increase of his usual price, or indirectly by an understanding with the prescriber as to the form of the prescription; increasing the doses or bulk without materially adding to the cost of the medicines.

We will take advantage of this occasion to allude to some abuses which *do* exist to a certain extent amongst us, and which are chiefly attributable to the over burthened ranks of both professions. Of the large number of medical graduates who annually derive their authority to practice from the flourishing medical institutions of this city, a fair proportion belong to Philadelphia, or conclude to remain here, and unfortunately their ratio of increase is greater than that of the population. We all know of the drawbacks and discouragements incident to establishing a medical practice. A number of young physicians, in the hope of surmounting the pecuniary difficulties which mark the commencement of their career, have opened drug stores, and conducted them either by the assistance of apothecaries, or with the slender stock of pharmaceutical knowledge acquired during the course of their medical education. At such stores medical advice is administered gratis, as an inducement to a certain class of customers who aim at avoiding the fee of the physician. This species of *counter practice* induces a similar one on the part of some apothecaries, from competition or necessity, and is one of the means of destroying the well defined line of separation.

Another serious feature in the existing state of Pharmacy, is the large number of badly qualified assistants. Some of these, with but a tithe of the requisite knowledge, open petty stores, and in order to get business, undersell their neighbors, until assurance gives them pecuniary success, or till they cease from inability to meet their engagements. The chief source of this class of apothecaries will be found in a deficient pharmaceutical education. Boys go to the business—stay one or two years, perhaps under unfavorable circumstances—become disgusted and leave their apprenticeship, to hire for a small salary, at places where they will hardly add materially to their stock of knowledge. Many of this class would have become useful and respectable members of the community, if they had been placed at a busines

better suited to their qualifications and inclination. Indeed, so important are a certain natural ability and a fair education to the professional success of the pharmacist, that it cannot be too strongly urged on those who take apprentices, to feel assured, as far as it is in their power, not only of their fitness for the business in the ordinary prerequisites, but that they have a knowledge of the onerousness of the task they assume, and are prepared with steady determination and perseverance to master the innumerable petty annoyances and difficulties which must inevitably attend their onward course. In fact, a certain degree of enthusiasm is needed by a boy in his passage through the first stage of his pupilage in a thorough establishment, without it causing disgust and dislike; and to compel years of labor from such as are not buoyed up by the hope of ultimate honorable success as pharmacutists, is almost cruel.

GUTTA PERCHA.—One of the happiest applications of this remarkable substance that we have met with, is in the shape of bottles for hydrofluoric acid. It is well known that the leaden bottles usually employed to hold this substance are frequently imperfect, and their contents lost. The gutta percha bottles are not only intact by the acid, but can be hermetically sealed by the same material, and their contents rendered perfectly secure. These bottles may be put to numerous purposes, and perhaps to none more valuable than as receptacles for liquids in medicine chests, especially those exposed to land carriage. We have seen funnels of the same material; and doubtless syphons, and various tube connections in pneumatic apparatus, may be formed from the same substance, which will offer a very valuable substitute for the usual glass implements.

WHALEBONE SPATULAS.—Mr. T. H. Tustin, in the *Pharmaceutical Journal*, suggests the employment of whalebone spatulas as a substitute for those of horn, which, he says, are to be decidedly superior to the latter, being more elastic and tougher.

A Universal Formulary: containing the methods of preparing and administering officinal and other medicines. The whole adapted to Physicians and Pharmacutists. By R. EGLESFELD GRIFFITH, M. D. Philadelphia. Lea & Blanchard: 1850. pp. 567. Octavo.

We know of no one better qualified for the task of preparing "a universal formulary" than Dr. Griffith, and he appears to have brought to the task the accumulated experience acquired during many years application as a medical writer and editor. The "Formulary" proper embraces a very large collection of recipes, besides those which are

officinal. The arrangement is alphabetical in relation to the drugs, all the simple preparations of each drug being arranged under its name, and in compound preparations under the head of the most important ingredient. This is decidedly the most eligible way of presenting the subjects. In addition to the formulary, many valuable tables are appended and general pharmaceutical directions, both as to manipulation and the classes of preparations. The index of diseases and their remedies will be found exceedingly useful in the selection of formulæ for particular diseases, by young practitioners and by others who consult the work with the same view. On the whole, we view this work of Dr. Griffith as a valuable acquisition to the medical practitioner, and as affording a useful book of reference to the apothecary on numerous occasions.

The American Medical Formulary: Based upon the United States and British Pharmacopœias. Including numerous standard formulæ derived from American and European authorities. Together with the medical properties and uses of medicines, poisons, their antidotes, tests, etc., designed for the medical and pharmaceutical student. By JOHN J. REESE, M. D., &c. Philadelphia. Lindsay & Blakiston: 1850. pp. 357.

We received the book of Dr. Reese too late to give it a close examination. It is more concise than the preceding, but embraces a variety of formulæ besides those officinal in the British and American Pharmacopœias. It contains a chapter on tests, another on dietetic preparations, a posological table, and as a whole is calculated to be useful to the physician as a book of reference.

THE
AMERICAN JOURNAL OF PHARMACY.

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JULY, 1850.  
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ART. XLVIII.—ON IMPORTATIONS OF IODINE.

BY ALFRED B. TAYLOR.

A brief notice of the character of importations of iodine within the past year or so, and of the effect upon it, of our present commercial regulations for excluding adulterations, may perhaps be not devoid of interest to the readers of the Journal, as the great and growing usefulness of this article, in the arts, as well as in pharmacy, renders it one of considerable importance.

Though by no means an abundant substance in nature, and though, fifty years ago, even its existence was unknown, yet it is tolerably well diffused, being found in the mineral, vegetable, and animal kingdoms. In the *mineral*, it has been discovered in various metallic ores, in the horn silver of Albarradon, (*Mexico*;) in the white lead of the mines of Catorce;* in an ore of zinc from Silesia; in certain coals, as well as in many mineral springs—as the famous Saratoga waters, &c.: in the *vegetable*, it is found in almost all sea plants, in some, growing in fresh water lakes, and in a few of Mexico, growing on the plains and the mountains: in the *animal*, it is met

* Am. Jour. Pharm., Vol. ix., 177.

with in the sepia, or cuttle-fish, the sponge, (whose ashes yield iodide of sodium,) the oyster, in the liver of the cod-fish and it is believed of several other species of fish, and in a singular insect found in Italy.

While the marine animals and plants containing iodine evidently derive this substance from the ocean, it is remarkable that the quantity discoverable in sea-water, is exceedingly minute, the most careful chemical analysis exhibiting a mere trace of it: so that there must exist very peculiar powers of absorption or secretion in these plants and animals to enable them to obtain an appreciable amount; unless iodine should prove to be a compound substance.

It is from the sea-weeds alone, that iodine can be profitably extracted; and even from those varieties, which yield most, (perhaps ten times as much as more ordinary varieties,) the product is very small, the "kelp" or fused ashes of the weed constituting a slight proportion of the original plant, and this yielding on an average considerably less than a half per cent. of iodine.

It may be incidentally mentioned as a striking instance of the new directions given to industrial enterprise by the discoveries of science, that this kelp was formerly obtained solely for the carbonate of soda it yielded, (ranging from 2 to 5 per cent.,) while it is now chiefly valued for its iodine, and chloride of potassium. These two substances appear, as Mr. Whitelaw (a manufacturer in Glasgow) has stated, to observe a tolerably uniform ratio of quantity to each other, the kelp containing the most chloride of potassium, containing at the same time the most iodine.

The process of subliming the iodine from the aqueous solution of kelp is described in the U. S. Dispensatory, and more fully in Graham's Chemistry, and in Pereira's *Materia Medica*, and need not here be quoted. The British iodine is the only kind that has been imported into Philadelphia for the last two years, or since the recent drug law has been in operation. During this time there has been no

case presented of an adulterated article of iodine, though it is said to be frequently adulterated with black oxide of manganese, plumbago, coal, slate, sand, &c., and M. Herberger found in one sample, native sulphuret of antimony, and in another more than half the article composed of artificial graphite ! * Dr. Christison, however, never met with any of these adulterations in his observations, and Dr. Pereira says, “in no samples of iodine which I have examined have I ever found any of these substances.” (Mat. Med., i. 225.)

As iodine is obtained from an aqueous solution, as it is moreover volatile, (for though its point of volatilization is 347° , its vapor passes over to a considerable extent with that of water at 212°),† it might naturally be inferred that it would be found very difficult,—without considerable loss,—to separate the iodine from this moisture.

Accordingly, this article, as met with in commerce, almost always contains a greater or less proportion of water,—the quantity of which is appreciable with tolerable precision by simple inspection, and unless considerable, in no wise affects its usefulness, as its chemical and medical properties remain unchanged ; the only disadvantage being that the *variableness* of its amount of moisture interferes with uniformity in the strength of its medicinal preparations. Where the degree of dampness is well ascertained it obviously could not diminish the therapeutic value of its solutions, the principal form indeed in which it is administered.

Within a few years past, a process has been successfully applied of *resubliming* this substance, and obtaining it nearly or quite anhydrous ; thus presenting the pharmacist (at an advanced price of course) with a pure article. I am informed by one of the leading chemical manufacturers of our city, that it has been but a very few years since this improvement in the manufacture, or rather in the

* Am. Jour. Pharm., vol. xviii., 77.

† Iodine evaporates at ordinary temperatures, and much more rapidly when damp, than when dry.

refinement of Scottish iodine has been effected. This, indeed corresponds with the assertion of Dr. Christison, made several years ago, that "until within a recent period, he had not met with any British iodine which did not contain from fifteen to twenty per cent. of moisture."* Dr. Pereira says (*Mat. Med.*, vol i., 225.) "The iodine of commerce is *always* adulterated with variable proportions of water. An ounce, if very moist, may contain a drachm, or perhaps even a drachm and a half of water." These observations seem to show not only that the refinement of iodine is of recent introduction, but that the quality of the ordinary article has been much improved within late years, since it is believed that the average proportion of water to be found in the iodine of commerce at present, is far less than that above given. Certainly no example has occurred of any importation of this article to Philadelphia since the operation of the drug law, with any thing like this amount of moisture; the greatest amount thus far having been but five per cent. These two qualities of iodine—the ordinary, or "commercial," and the anhydrous or "resublimed"—form two very different and well defined varieties; the former occurring in irregular or amorphous lumps (with a frequent tendency to minute crystallization) having a dull bluish, greyish, or dark lead color, and characterized by its tendency to adhere to the bottle or containing vessel; the latter occurring in moderately small and uniform scales or micaceous crystals, of a blue or somewhat steel like color, and with a clean metallic lustre. The first contains an amount of water ranging from one to ten, or perhaps even fifteen per cent; the last is found varying from a condition of perfect dryness to one with a half or one per cent of moisture.

In the mercantile world, the term "Iodine" is still appropriated to the former variety, and wherever it is used in the market, or quoted in the London prices-current, it is

* U. S. Dispensatory, p. 391.

believed invariably to designate this article, while the purer variety is with equal uniformity characterised as "re-sublimed" or "sublimed" iodine. The average price of the latter in London, is about 50 per cent. higher than that of the former, the one being worth at present about eight pence per oz. the other about one shilling per oz.

The following table exhibits the amount of each kind imported into our city during the last year, and thus far the present year.

	Commercial.	Re-sublimed.	Total.
1849	17,003 oz.	4,432 oz.	21,435 oz.
1850	9,406	4,484	13,890
	<hr/>	<hr/>	<hr/>
	26,409	8,916	35,325

This whole amount of iodine was of excellent quality; the commercial article being found perfectly pure with the exception of a degree of moisture ranging from 2 to 5 per cent. ;*—the resublimed affording no appreciable trace of any impurity.

The opportunity may here be taken of presenting a few remarks on the action of our law for preventing the importation of adulterated drugs, upon this article, and the difficulties which have arisen in regard to its practical application to particular cases. One subject of doubt which early presented itself to the different Examiners appointed under the law, was the propriety of requiring the same standard of excellence for drugs and chemical preparations not designed as for those designed for medicinal application: and it had been the practice at one at least, of our ports, to make a

*An analysis of some commercial iodine, (said to be of the same kind as a lot included in the above,) made by Prof. Hays of Boston, for the Examiner of that port, gives the following result:

" Water,	-	-	-	.68
Muriatic acid,	-	-	-	.13
Pure iodine,	-	-	-	99.19=100."

A degree of purity not often surpassed by the refined article.

discrimination in favor of such articles as had not such destination. In consequence, however, of the rejection of some iodine, the importers made application to the Treasury Department to allow their condemned lot to be delivered, on their giving bond to the U. States, that the article should be re-manufactured, or used exclusively in the arts. The Hon. Secretary of the Treasury, by instructions dated July 16th, 1840, replied, "On a careful examination of the law, the Department is unable to discover any authority to direct such delivery or to sanction any departure from the course prescribed;" and accordingly the only consideration which could since be entertained by the Examiner in deciding upon the admissibility of any drugs, medicinal or chemical preparations, "used wholly or *in part* as medicine," has been their "fitness for medical purposes"—whatever might have been the object for which such articles had been imported. As was to have been expected some little dissatisfaction has been occasionally expressed by those who have been incommoded by this restriction.

It might, perhaps, have been questioned whether by the spirit of the law, a bond or other satisfactory evidence of the destination of chemicals, did not indeed furnish the very ground of determining the Examiner's jurisdiction in the matter. By the provisions of the act, drugs imported into this country are to be condemned, and destroyed (unless re-exported out of the limits of the U. S. within six months after the condemnation,) if they are found "to be so far adulterated or in any manner deteriorated, as to render them inferior in strength and purity to the standard established by the United States, Edinburgh, London, French and German pharmacopœias and dispensatories, and thereby improper, unsafe, or dangerous to be used for medicinal purposes."

With what justice can an article be pronounced improper, unsafe or dangerous for medical use, which is known to be wanted for no such application? Is it not somewhat incongruous that fitness for *medical* purposes should be

required in a chemical preparation, purchased and designed for a different purpose—for assisting the inquiries of science, or for enriching the products of art? To the allegation made to the daguerreotype artist, for example, that his importation of wet iodine (supposing it to be really desirable) was not a “proper” medicine, he might very reasonably reply that it could not be an *improper* one, since it was no medicine at all.* Might not the principle, rigidly enforced be extended to the rejection of all crude drugs, or chemical materials? in other words to the almost complete suppression of our chemical manufactures? it being well known that the fine and high priced preparations cannot be advantageously employed in obtaining chemical products, and would not give these products any superiority if they could be thus employed.

On the other hand, it may be urged that to allow the distinction advocated, and make alleged destination the criterion of admissibility for drugs of doubtful character, would open the widest door to a fraudulent evasion—if it would not almost defeat the very object—of the law; that it would afford the dishonest importer as full opportunities as could be desired, of gathering from abroad, and vending his inert or noxious drugs, at comparatively little risk;—that the enforcement of the penalty, if he saw fit to forfeit his bond, would constitute a poor reparation of the injury the community might sustain by his impositions; and that on the whole, the interests of the public would probably suffer less by an unjust restriction, than by an undue extension of the freedom of trade.

A question of much greater delicacy and uncertainty, arises as to the degree of purity which should be demanded in iodine, to fairly meet the requisition of the act of Con-

* The manufacturer of quinine might offer the same justification of a low priced, or damaged article of Peruvian bark. And yet either article would have to be condemned, with the sole explanation, that although best adapted to the objects of the respective importers, it would be unsuitable for another very different purpose.

gress. The standards of purity in medicinal preparations recognised by the statute, are those established by the various pharmacopœias and dispensatories; construed by the circular instructions of the Department of July 8th, 1848, to intend in the case of such preparations—"the pharmacopœia and dispensatory of the country of their origin" respectively. As the only importations under the law (as has already been mentioned) have been of British iodine—manufactured exclusively at Glasgow, the only legitimate authority by which the Examiner is to be governed is of course the Edinburgh Pharmacopœia. This work unfortunately assigns no distinct degree of impurity as the limit of goodness. It recognises "the almost uniform presence of water in commercial iodine," and its consequent unsuitableness "for making preparations of uniform strength," and lays down certain directions for drying it, "till it *scarcely* adheres to the inside of a dry bottle:" giving thereby a sanction to an article of considerable dampness, and by its direction to the pharmacist, a clear implication that he may have occasion to use it. From the fact that "pure iodine, diffused in water, forms a clear solution with a certain proportion of quick-lime," the pharmacopœia has also given a method of detecting its moisture, when it exceeds two per cent.

In the absence of any more direct standard, as well as of any specific regulations or instructions, it is not surprising that on a subject based ultimately on grounds of general expediency, there should have been a difference of opinion among the Examiners. However to be expected, such diversity was doubtless much to be regretted, as interfering materially with both the estimation and the efficiency of the law. Finding that the practice at different ports had been marked by considerable discrepancy, and having no decisive rule by which to act, the Examiner at Philadelphia could only exercise his best judgment, guided by the opinions of those on whose experience and information he could most rely.

Considering that the presence of a small quantity of water in commercial iodine is neither designed nor calculated to deceive as to its quality; considering also that it is not an *addition* to the article, but a want of perfection in the process of its purification, it seems hardly a correct application of language to designate it as either an "adulteration" or "deterioration," considering, moreover, that this article may be advantageously employed, when of ascertained strength, in a variety of pharmaceutical preparations, still less can it fall within the category of drugs "improper, unsafe or dangerous to be used for medicinal purposes."

From a sincere desire to establish for our city a high standard of excellence in its imported drugs without bearing too severely upon the honest importer, the limit of moisture in commercial iodine was fixed at five per cent.,—a purely arbitrary point, but one which was believed to represent a good quality of the article, and one at which it might in many cases be safely and beneficially employed. Such were the views and the practice of the Examiner at this city, when informed by the importers that a lot of their iodine had been condemned at Boston, though the same quality had been admitted into Philadelphia."*

Communication was held with the Examiner at that port, and also with the Secretary of the Treasury, detailing the grounds of the course pursued at this place, and asking from the Department more specific instructions, in order to secure a greater uniformity of action in the administration of the law. The reply to this request (received March 23d, 1850,) transmitted a copy of special instructions, which had long previously been given to the Examiner at the port of New York, but which were now communicated to this port for the first time. These instructions having reference

* It is proper to state that this lot of iodine was afterward permitted to pass the Custom House at Boston.

to a disputed case of condemnation of iodine at New York,† confirmed the rejection, on the ground of the iodine being “inferior in strength and purity to the standard established by the Edinburgh Pharmacopœia,” which the Examiner stated to be “*about 98 parts!*”

Although this decision of the Department is predicated on a representation entirely erroneous,—the Edinburgh Pharmacopœia establishing for this article *no* standard of strength and purity, and in its definition of “Iodineum” giving an account of a substance certainly very different from one containing “*about 98 parts,*”—it nevertheless forms the authoritative exposition of the statute, and of course leaves the Examiner (whatever may be his own views of its propriety,) no discretion in carrying out its requirement.

The effect of this restriction is almost to exclude the article known in commerce as “iodine;” (which is believed rarely to attain the dryness of 98 per cent. ;) and to require the “re-sublimed” article, although this had been introduced but a year or two previous to the passage of our law, and *since* the publication of the Edinburgh Pharmacopœia, on the supposed authority of which, the requisition was adopted !

Can it have been the design of the act for preventing adulterated importations, to exclude a character of chemical from our ports, because the progress of science had recently enriched the market with a superior quality of manufacture? Shall the fact of a “first quality” be supposed necessarily to vitiate and supersede a “second quality” of the same article? in a case, above all, where the one can neither be imposed nor mistaken for the other?

It is worth mentioning that the market article “iodine,” has a much larger demand than the “sublimed” preparation; being extensively used in the manufacture of a valuable class

† An analysis of this iodine by Dr. Reid, of N. Y., gave

Water, - - - - 6.

Pure iodine, - - - - 94.=100.

and he returned it as “improper for medical use.”

of medicinal agents—the *iodides* ; more particularly the *iodide of potassium*. Singularly enough, while this latter article if imported, pays a duty of 20 per cent., the iodine from which it is manufactured pays a duty of 30 per cent., their commercial value being very nearly the same ; thus giving the foreign preparation an encouragement of about 10 per cent., against which the American manufacturer must struggle, even when sure of obtaining his material.

In order to show how differently this subject is appreciated by other governments, it may be stated that by the tariff of France, “iodine” is now admitted into that country free of duty ; so that while the policy of the one country offers a liberal encouragement to its importation, that of the other has been not only to restrain its introduction, but by the recent practical operation of its laws to confiscate it when received, and thereby (it is needless to add) totally to abolish from the United States an important manufacture.

No reference thus far has been made to the French iodine, though to France belongs the credit of the discovery—not only of the article itself, but of the process of purifying it from water by re-sublimation. Although imported from France in the refined or anhydrous state, long before such improvement had been attempted in Great Britain, it is manifest that no considerations of the superiority of this article to the Scottish, could properly influence the Examiner’s estimate in deciding upon the comparative excellence of the latter ; since by the instructions of the Treasury Department already referred to, the only standards admissible in determining the strength or quality of a drug, are those of the country of its exportation. Of course the British iodine must be judged alone by British authority.

Almost immediately upon the discovery of iodine by M. Courtois at Paris, the manufacture of the article was commenced in Scotland, and was prosecuted there with even superior facilities to those of its native country, in consequence of the abundant accumulations of iodine sea-weed on its more favorably situated coast, and the adjacent islands.

It was not long before the manufacturing chemists of France succeeded in preparing an article perfectly free from water; and during a year of considerable scarcity in the production of iodine in that country its ports were thrown open to the admission of the British article; which was re-sublimed and much of it re-exported to the country of its origin. The French iodine thus acquired a reputation for purity, which has since been uniformly sustained; although the present English re-sublimed, is in no respect inferior. There is a slight difference between them in the shade of color and general appearance of the crystals, which is readily recognised by those accustomed to their peculiarities; though no appreciable difference is presented by a chemical examination. The distinction is probably produced by a difference in the material of the retorts from which the iodine is evolved, and possibly by a trace of sulphur in the British article (too small to be indicated by ordinary tests,)—derived from the sulphuric acid with which it is prepared;—the French being as is believed, prepared with muriatic acid.

The application of our drug law has been spoken of as having occasionally received a somewhat rigid construction, and as having acted oppressively in particular instances, on the honest importer. However this may be, there can be but one opinion as to the general benefit of the regulation, and it is believed that our leading importers themselves would be among the last to wish the law revoked. The community has been protected—at least from foreign adulterations, and there can be no doubt that the general character of our drugs has greatly improved within the last two years. Importers have been rendered far more cautious in the quality of chemicals ordered from abroad, and whenever inferior articles have been presented, which has been of comparatively rare occurrence, they have been promptly rejected. If any relaxation of the standard of commercial iodine should be found desirable, such a degree of purity will doubtless be ultimately adopted as an enlarged and liberal view shall show to be most conducive to the interests of all.

ART. XLIX.—ON AMERICAN NARCOTIC AND OTHER EXTRACTS.

About four months ago the Editors of this Journal received from Messrs. Tilden and Co., of New York, four specimens of Vegetable Extracts prepared at their establishment at New Lebanon, New York, derived respectively from Conium, Hyoscyamus, Taraxacum and Sanguinaria, and the reception of which should have been acknowledged in our last number, but owing to accident they were overlooked at the proper time.

The chief merits claimed by the manufacturers for these extracts, are such as arise from a proper selection of the crude material grown in their extensive botanical garden, and from a careful preparation of the extracts by means of apparatus for evaporation in vacuo. We have here all the elements for their successful fabrication—assuming that the plants are imbued with their natural medicinal force and that the operators understand the principles of the process.

In reference to the specimens submitted, we will observe that whilst they present in an eminent degree the sensible properties of the plants they represent, we consider them to be deficient in a few particulars which we will notice, not in a hypercritical spirit, but with a view to the improvement of the articles noticed, so far as it can be done by hints. It may be well to state here that we believe that any manufacturer who justly claims the patronage of pharmacologists, should be careful to derive his products from the precise sources designated in our National Pharmacopœia; and avoid embracing in them any substance not called for in that authority.

1st. *Extract of Dandelion*.—This extract is too soft, having a pulpy consistence; the evaporation has not been carried far enough; it has an herbaceous odor, and dark olive green color, due to the chlorophyllin of the leaves, the

whole plant having been extracted. The root only should be employed, and that collected between the first of September and the first of November. Extract of dandelion should be brown or dark brown, a bitterish slightly sweet taste, acid to litmus, and a consistence suitable for pills. The Pharmacopœia formula is defective in directing this extract to be made by boiling. The effect of heat continued for a length of time on the juice of dandelion is to decrease and ultimately destroy its bitterness, and to give to the extract a saccharine taste and molasses like consistence.

We have a specimen of this extract before us made by the "United Society" of New Lebanon, marked "extra," and prepared from the roots only, which has this objection—indeed it is so sweet as to be rather agreeable to the taste. We have another specimen that was prepared strictly according to the following directions, viz:

The roots removed from the earth late in September, were washed, sliced transversely, and well bruised. To each pound of the pulpy mass three ounces of alcohol were added, the whole left to macerate for thirty-six hours in a covered vessel, then expressed, strained and evaporated on a water bath to the pilular consistence. Thus prepared it has a brown color, a decided bitter sweet taste, and has been approved by medical men.

We believe if Messrs. Tilden & Co. would employ the root only, either with or without the alcohol, (which was used to allow of the maceration,) and remove the fluid portion by powerful pressure, subsequently repeated after moistening the residue with its weight of water, that with their superior advantages in conducting the evaporation, they would be able to furnish an extract of dandelion of great superiority.

2d. *Extract of Blood-root.*—This specimen, which is called an alcoholic extract, has a soft consistence like candied honey, a dark red color, and is highly active. It is too soft, however, and probably from the presence of some uncrystallizable sugar, exhibited evidences of fermentation.

3d. *Extract of Hemlock*, (Conium.)—This sample, now nearly five months in our possession, has a soft pulpy consistence, dark green color, and the heavy, peculiar odor of the plant when bruised. When triturated with powdered caustic potassa, the peculiar mouse-like odor of conia became strongly perceptible, together with a pungency due to ammonia eliminated by the potassa from the natural ammoniacal salts. When compared by this test with the best English extract we have met with, it quite equals it. There is perhaps no instance where vacuum evaporation is more applicable than in reference to Conium, the active principle of which, in a free state, passes off with evaporating water like a volatile oil. Now, although conia exists naturally combined with an acid, yet we have reason to believe that this natural combination is not so fixed as to resist the decomposing agencies of heat and exposure to which the juice is often exposed before its final inspissation. If Tilden & Co's. extract of conium was of the proper pilular consistence, and had the chlorophylle removed, (according to the Pharmacopœia, it would leave little to be desired.

In observing closely the specimen before us we observe numerous brown spots on the surface of the extract against the glass, in which, owing to excess of moisture a slow fermentation has commenced, resulting in the destruction of the chlorophylle and the formation of an acid, probably the acetic, as according to the label alcohol has been used in its preparation. This change would not have occurred had the extract been of firmer consistence. The general mass of the extract has about the same degree of acidity observable in the English article.

Extract of Henbane, (Hyoscyamus.)—This extract, as it now stands before us, consists of a dark green pulpy mass, with here and there through it, and on its surface, separated portions of a dark brown syrupy liquid, arising from the insufficient evaporation of the extract originally, and the

subsequent separation of the insoluble chlorophylle and albuminous portion, from the softer soluble part. It is not more acid than the English, nor is there any evidence of local decomposition as in the preceding. It has the heavy narcotic odor of the bruised plant very strongly manifest, owing no doubt to the low temperature at which it was prepared.

We have not seen the extracts of *Belladonna* and *Stramonium* as prepared by Tilden & Co., but presume they are similar in quality with those we have described.

Since writing the above, we have conversed with Dr. Conrad, of the pharmaceutical department of the Pennsylvania Hospital, in reference to these extracts. He informs us that the extract of *Conium* of Tilden & Co. has been used in that Institution with decided satisfaction—equalling the English extract, in the opinion of the physicians of the House. We are gratified to hear this testimony in favor of the American extract, because it leads to the inference that the ill success which has attended its use on many occasions may be attributed to faulty preparation or ill-timed gathering of the plant, rather than to our climate.

Mr. Tilden informs us that his apparatus consists principally of two evaporators, one capable of holding several hundred gallons, designed for concentrating the liquid to a syrupy consistence, and which is heated by steam circulating in tubes penetrating the interior of the evaporator. An exhausting pump constantly acts on the atmosphere of this vessel so as to reduce the boiling point to about 140° Fahr. The openings of this boiler are comparatively small, as the concentrated juice infusion or tincture can be drawn off by a cock beneath. The other evaporator, in which the extract is finished, is much smaller. The openings are larger, so as to admit of the removal of the extract when finished. We presume there are certain practical difficulties that present themselves, in the use of this arrangement, after the product has attained a certain consistence, and this may be the reason of the softness of the extracts noticed,

but if such is the case it would be better to achieve the evaporation in an open water bath vessel with constant stirring, than to have the extracts as we have described them.

Much has been written on the effects of climate in modifying the medicinal power of plants, by changing their chemical composition and augmenting or diminishing their activity. It has been repeatedly averred that the European narcotics most in use, when grown in this country, are decidedly less potent, than in their native soil. Enough is already known in this department of botanical science to give some credit to the opinion, but we should greatly prefer to have the point fairly tested in relation to Conium, Hyoscyamus and Belladonna. The first two of these we are informed have been acclimated in some localities, in the Northern States. We have seen Belladonna, this season, growing with rank luxuriance in the garden of Professor Wood of this city. To arrive at a good result it would be necessary to have the extracts prepared with care, and tested therapeutically by a physician interested in the subject at one of our hospitals, where the English extracts may be in use. It would be very gratifying to get favorable results, and we should be most happy to make our pages the vehicle for communicating them, should any of our medical and pharmaceutical friends be disposed to assume the task.

In conclusion we will remark, that the extracts of Messrs. Tilden and Co. are enclosed in fluted glass bottles, the corks faced with tin foil and securely covered with a metallic cap. If these gentlemen will bring to bear on their manufacturing operations all the light of pharmaceutical science, and adhere to a conscientious construction of the National Pharmacopœia, their products will prove to be a boon to the medical community, and we doubt not that eventually they will receive a substantial reward, both in increased confidence and patronage.

W. P., Jr.

ART. L.—ON THE IMPORTANCE OF A MORE CONSCIENTIOUS ATTENTION TO UNIFORMITY OF STRENGTH IN THE PREPARATIONS OF OPIUM.

In some remarks by M. Chevallier, published in the *Journal de Pharmacie* for January, the importance of a more general and thorough attention to the strength of the preparations of opium was shown to be necessary. He says that three kinds of opium are used in France: Smyrna, Constantinople and Egyptian, in which the morphia varies from four to ten per cent. The *Codex* directs selected opium (opium choisi) without specifying the commercial variety, but says M. Chevallier, will the pharmacist select Smyrna, or Constantinople, or Egyptian? Assuming that he chooses the first or strongest, the quality of the article varies from several causes. 1st, In the amount of moisture which varies from 5 to 25 per cent. at least, according to the age and original moistness of the drug. 2d, To the extent of adulteration, as it is presumed that the pure exudation rarely, if ever, enters general commerce. The value of this opium, as indicated by the percentage of morphia, is shown to be very variable, as it contains from 2 or 3 to 10 or 12 per cent., as observed in this city, although it is rare to meet with a weaker opium than 5 or 6 per cent. If it were possible to base the proportion of opium in its preparations on its morphia strength, no difficulty would be experienced, but unfortunately a rapid, easy and reliable process for the extraction of morphia is yet a desideratum.

The French *Codex* says nothing in reference to the hygrometric condition of the opium. The United States Pharmacopœia, by directing the opium in its preparations to be in powder or coarse powder, guards against this source of variation. But unfortunately, little regard is had to this recommendation—the opium is used in the state it is found, at the time it is wanted, without regard to its dryness. It must be acknowledged that it seems a use-

less labor to dry opium for the purpose of making laudanum when it is in a moist condition, but there is no excuse for not allowing for the water it contains. If 100 grains of the moss, representing the exterior and interior, be carefully dried over a lamp or stove, the number of grains of loss will indicate the per centage of moisture. Then by a simple rule of proportion, the condition of the opium can be arrived at. Suppose the loss is 9 grains, and the operator desires the weight of moist opium for a gallon of laudanum, proceed thus: as 91 grs. (the dry opium in 100 grs. of the moist,) is to 100 grs., so is 4800 grs. (10 oz.) to 5275 grains, or very nearly 11 ounces.

Another serious source of variation in this class of preparations is the use of avoirdupois instead of troy ounces, making a difference of one-eleventh. Even this reduction, which is as frequently the result of oversight as design, is not as serious in its consequences as that which arises from a deliberate depreciation of the quantity of opium with a view of lowering the price of the tincture per ounce. A distiller may make alcohol with any amount of water he pleases, but when the inspector examines it, he decides its value by its alcoholic strength, and the buyer is not deceived, but it is very different with a medicine on the action of which life may hang. Before the Drug Law was in operation, we recollect an instance where opium, containing but 2 per cent. of morphia, was bought up by a retailer for conversion into laudanum, and the mere fact that it was sold as, and had the apparent qualities of opium, was sufficient to satisfy his mind, although the price paid for it was not one-third of the value of good opium.

The law for the prevention of the importation of adulterated drugs, medicines and chemicals, which is now in force at our custom houses, will, if properly enforced, in a great degree, prevent the introduction of bad opium. We have understood that the inspectors have assumed 9 per cent. of morphia as the strength necessary to pass the drug, and if carried out faithfully,

we will not hear much of bad opium, at least in original packages. After all the checks of law, rogues will yet have their way, and nothing but education and principle in those who have the practice of Pharmacy in their hands, will prevent either fraudulent practices on the one hand, or errors of judgment on the other, in relation to this important subject.

W. P., JR.

ART. LI.—MINERAL WATER SYRUPS.

BY AMBROSE SMITH.

We have thought that the results of some experience in the preparation of these syrups which most city apothecaries have frequent occasion to make, might be interesting to many of the readers of this Journal.

LEMON SYRUP.—This is now almost universally made from citric or tartaric acid, oil of lemon and water, instead of lemon juice. Some of the confectioners when they are overstocked with lemons make them into syrup, but from the use of fruit that has partially spoiled and from the syrup being made in such large quantities at once, as to become more or less altered by keeping before it is consumed, the article thus made is usually inferior to that made from acid and oil of lemon.

Citric acid is decidedly preferable to tartaric for preparing it. The syrup made with the former acid has a more agreeable flavor which it retains longer unimpaired. We have found the syrup made with tartaric acid, when long kept, to throw down a bulky white granular deposite which was apparently grape sugar. The flavor of the syrup changes gradually on keeping long, even when made with citric acid. This is probably due to some change in the oil of lemon by which the syrup acquires a terebinthinate flavor. This turpentine taste is very common in the lemon syrup which is manufactured and sold wholesale, and may frequently be due to the employment of impure oil of lemon. A common

adulteration of this oil is the admixture of recently distilled oil of turpentine, or "camphene," and the adulterated oil may contain a considerable portion of it, without its being perceptible by taste or odor while new, but as the camphene becomes resinous, the turpentine flavor is developed. But even pure oil of lemon degenerates in flavor and odor when long kept, and the alteration is probably more rapid when it is diffused through the syrup and assisted by the action of the acid; therefore we have found it most advantageous to prepare the syrup in small quantities so that it will be consumed before there is any change in its quality. The following formula we have been accustomed to follow, by which a pleasant syrup can be made in a few minutes.

Take of Oil of Lemon	$\frac{1}{2}$ fl. dr.
Citric Acid	1 oz.
Simple Syrup	1 gall.

Rub the oil of lemon first with a little powdered sugar, and afterwards with a portion of syrup, dissolve the citric acid in an ounce or two of water, and mix the whole.

GINGER SYRUP.—The formula of the Pharmacopœia makes a syrup of about the proper strength for use with mineral water. As it is usually made in considerable quantities it will be found most convenient to prepare the simple syrup at the time, and while it is hot to pour on the surface the tincture of ginger, allowing the alcohol to evaporate before mixing with the syrup. If the tincture is mixed directly, the syrup will be cloudy; on the other hand, if it is allowed to remain too long on the surface of the hot syrup before mixing, the resin separates in globules which can not afterwards be thoroughly diffused through the syrup. The tincture should be allowed to evaporate from the surface of the syrup until the vapor ceases to ignite on the approach of flame, then mixed immediately.

A good method of making ginger syrup is to pour the tincture on to the sugar, which is to be exposed to the air until the spirit has evaporated, and then made into syrup. This

plan is more operose however, and does not answer better than the one indicated above.

CAPSICUM SYRUP.

Take of Simple Syrup 2 pints.

Tincture of Capsicum 1 fl. oz.

Proceed as for ginger syrup.

SARSAPARILLA SYRUP, for mineral water. As this syrup is intended for making a pleasant beverage, it is made much weaker of sarsaparilla than the compound syrup of the Pharmacopœia, and the senna, guaiac, &c., which enter into the composition of the latter, are very properly omitted.

The following is the formula we have been accustomed to employ. Take of

Sarsaparilla, finely bruised,	} each, 2 lbs. (avoir.
Liquorice Root, do.	

Sugar	30 lbs. (avoir.)
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Oils of Anise, Wintergreen and Sassafras,	each, 40 drops.
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Oil of Cinnamon,	5 drops.
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Water,	q. s.
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Digest the roots 12 hours with 2 gallons of warm water, then put into a displacer and displace, adding sufficient water, until 2 gallons of infusion are obtained. In this dissolve the sugar with the aid of heat, and to the syrup when cooled, add the oils previously rubbed up with a little sugar.

The following formula is employed by some of the druggists of this city.

Take of Sarsaparilla, Liquorice root,	each 1 lb.
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Cinnamon, Sassafras,	each 6 oz.
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Cloves, Anise, Coriander,	each 2 oz.
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Red Saunders, Cochineal,	each 1½ oz.
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Alcohol,	2 pints.
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Water,	2 gallons.
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Digest the above for 4 days, strain and make a syrup with 27 lbs (avoir.) sugar.

It is also frequently made by diluting the compound syrup with twice its measure of simple syrup, and adding the essential

oils. The fluid extract of sarsaparilla, if mezereon enters into its composition, does not answer, as the persistent acrimony of this bark is so perceptible even in the diluted syrup as to make it unpalatable.

ORGEAT SYRUP.

Take of Sweet Almonds,	12 oz.
Bitter do.	4 oz.
Sugar,	6 lbs. (avoir.)
Water,	q. s.
Orange-flower Water,	4 fl. oz.

Blanch the almonds, pound them thoroughly in a marble mortar, mix gradually with $1\frac{1}{2}$ pints of water and strain with expression. Repeat the process with $1\frac{1}{2}$ pints more water, and make up the strained liquor to 3 pints, in which dissolve the sugar with a gentle heat. When cold, add the orange flower water, and mix.

It is well to soak the blanched almonds in cold water for some time, as it renders them easier to pound up. Orgeat syrup should not be boiled, as this would coagulate the albumen of the almonds and cause the syrup to separate.

It is important to the keeping of fruit syrups, especially, that they should be nearly saturated solutions of sugar; they should mark 36° Baumé at 60° . Fifteen or 16 pounds avoirdupois of refined sugar to the gallon of liquid will generally make 2 gallons of syrup of the proper density. It is better however if the syrup is to be kept any length of time to test the density by the saccharometer. Light Havanna or Brazil sugar will do for many syrups, but as these sugars are usually damp, it is necessary to use them in rather larger proportion. There is so little difference in price that it is scarcely an object to use any but refined sugar. The kind sold as crushed loaf is the most convenient for dissolving.

STRAWBERRY SYRUP.—Strawberries yield from one-third to one half their measure of juice, according to the quality of the fruit. They should be fully ripe, but freshly gathered and free from decay. The syrup is sometimes prepared by

throwing the fruit by portions into a thick boiling syrup. In this way the juice is dissolved into the syrup, the marc left floating on top and separated by straining the syrup through a conical flannel bag. The syrup is to be brought to the proper density afterwards by adding either sugar or water as required.

We have found this method rather troublesome, and prefer to express the juice. The following is the formula we have frequently employed; we give the quantities for about 8 gallons of syrup. Take 30 quarts of strawberries, mash them with the hands in a wooden tub, and put them on a strainer of coarse strong unbleached muslin. When all the juice has passed that will without pressure, tie the edges of the strainer together so as to form a bag, and by means of a press express the remainder.

Take of Sugar,	64 lbs. (avoir.)
Water,	2 $\frac{1}{4}$ gallons.

Heat in a tinned copper pan over the fire, stirring the sugar until it is dissolved or nearly so, and the syrup begins to boil, then mix the strawberry juice (which will be about 2 $\frac{1}{2}$ gallons,) and continue the heat until the syrup has boiled two or three minutes. The syrup should mark 31° Baumé while boiling, and must be brought to that density, if too thin, by boiling a few minutes longer, if too thick by adding water. After removing from the fire skim and strain the syrup.

If it is intended to be kept long it is better to bottle it while hot, and when cold to lay the bottles on their sides. The bottles olive oil comes in (well cleaned) answer very well; druggists generally have them on hand and have little other use for them, and as the glass is thin, they are not apt to break from the heat of the syrup.

RASPBERRY SYRUP.—We have made good raspberry syrup as follows. Raspberries 36 boxes, (such as they are brought to our market in,) sour cherries, (murillos or other good pie cherries,) 4 lbs. Obtain the juice, which will measure about

2 gallons, and use 60 lbs. (avoir.) sugar, and 2 gallons of water, and proceed as above directed for strawberry syrup.

The cherry juice gives a tartness which improves the flavor of the syrup, and its use seems to diminish the tendency to gelatinize, which is a troublesome peculiarity of this syrup.

RASPBERRY VINEGAR.

Take of Raspberry Syrup, 2 pints.
Acetic Acid, (No. 8.) $\frac{1}{2}$ fl. oz.

Mix them.

BLACKBERRY SYRUP.—Made in the same manner as strawberry. As this is rather an insipid syrup, it would probably be improved by adding some aromatics as cloves and cinnamon.

PINEAPPLE SYRUP, is sometimes made by putting sugar on slices of the fruit as detailed by W. Procter, Jr., in his edition of Mohr and Redwood.

This method makes a nice syrup, but we prefer the plan of expressing the juice as being more convenient, and in our experience, making an equally agreeable preparation. Pare the pineapples and mash them, without slicing, in a marble mortar and express the juice. Mix the marc with half as much water as there was juice obtained, and express again. To the latter liquor and half the juice add the sugar, and heat until it is dissolved, then mix the remaining juice and continue the heat until the syrup begins to boil. Remove from the fire, skim and strain.

ORANGE SYRUP.—Grate off the yellow outside peel, cut the oranges and express the juice with which a syrup is to be made as directed for pineapple syrup, and when it begins to boil mix the grated peel with the syrup and allow it to infuse in a covered vessel till cool, then strain.

One dozen fine oranges will make $1\frac{1}{2}$ to 2 gallons of syrup.

VANILLA SYRUP.

Take of Vanilla, 6 drs.
Boiling Water, $4\frac{1}{2}$ pints.
Sugar, 8 lbs. (avoir.)

Reduce the vanilla to coarse powder with a portion of sugar, and infuse in the boiling water 2 hours; then strain and dissolve the sugar in the infusion. Or,

Fluid extract of Vanilla,	$\frac{1}{2}$ oz.
Simple Syrup,	1 pint.
Mix.	

NECTAR SYRUP.—Various mixed syrups have been sold under this name. A mixture of ginger and sarsaparilla makes a syrup resembling the “nectar syrup,” of one of our mineral water manufacturers. A mixture of orgeat and strawberry is used in some establishments under this title.

ART. LII.—ON THE ALCOHOL-TEST OF THE PURITY OF CASTOR AND CROTON OILS.

BY JONATHAN PEREIRA, M. D., F. R. S.

It is well known that both castor and croton oils are remarkable for their great solubility in alcohol, and on this property is founded the usual test for determining their purity and freedom from other fixed oils. For reasons presently to be detailed, I believe this test to be a very fallacious one.

I. When either castor oil or croton oil is mixed with alcohol, the two liquids exercise a mutual solvent action on each other. It is usual to speak of the solubility of castor or croton oil in alcohol, but the solubility of alcohol in these oils is not even alluded to in chemical and pharmacological works. Yet nothing is more easy to prove than that the solvent action is mutual.

Expt. 1.—Sixty-five vols. of English expressed castor-oil were mixed with sixty-five vols. of rectified spirit, sp. gr. 0.838. By shaking, a uniform, clear mixture was obtained.

After several weeks, the mixture had separated into two strata; an upper spirituous one of twelve vols. and an inferior oily one of one hundred and eighteen vols. The supernatant spirit was found to contain oil in solution.

In this experiment, then, fifty-three vols. of rectified spirit must have been held in solution by the castor oil.

Expt. 2.—Eight vols. of pale or amber colored East India croton oil were mixed with eight vols. of alcohol, sp. gr. 0.796, and gently heated. In two days a separation had taken place; the oil now measured eight volumes and three-quarters, while the alcohol measured only seven volumes and a quarter.

In this case the croton oil had taken up three-quarters of a volume of alcohol.

The mutual action of these oils and alcohol appears to me to be similar to that of ether and water. If equal volumes of pure anhydrous sulphuric ether and water be mixed, the mixture on standing separates into two strata; an upper one, consisting of ether holding water in solution, and an inferior one, consisting of water, retaining some ether in solution. The separation of the two liquids by repose, is effected, partly by the difference of specific gravity, and partly by the force of cohesion acting between homogeneous particles.

In the case of spirit, and either castor or croton oil, the phenomena attending the separation are of a very peculiar kind, and require further investigation. By mere shaking without any alteration of temperature, a perfectly clear, transparent, homogeneous liquid is obtained, which by repose becomes (often in a few seconds) cloudy, and in a few hours or days, a separation into two strata of liquids is effected.

II The mutual action of alcohol or rectified spirit, and either castor or croton oil, is not uniform, but varies with different samples of oil. At first I was inclined to ascribe this variation to differences of purity in the several samples

of oil examined, but I am now convinced this is not the case; and that they depend on other circumstances. To Mr. Herring I am indebted for the means of establishing this fact, as he has supplied me with authenticated specimens of East India castor and croton oils, and of castor and croton oils expressed in his laboratory.

Expt. 3.—Ten vols. of West India* castor oil were mixed with ten vols. of rectified spirit. By shaking, the mixture became clear and transparent. After a few minutes it was hazy, then cloudy and turbid. The tube was immersed in warm water; and the cloudiness disappeared. In eighteen hours the mixture had separated into two clear liquids; an upper spirituous one of three vols. and a lower oily one of seventeen vols.

Expt. 4.—Ten vols. of East India castor oil were mixed with ten vols. of rectified spirit. A cloudy or milky mixture was obtained, which no shaking would render clear; but by immersing the tube in hot water, the mixture became quite clear.

Expt. 5.—Ten vols. of English expressed castor oil were mixed with ten vols. of alcohol; by shaking, a clear transparent mixture was obtained. After a few minutes a haziness began to appear, and in eighteen hours the mixture had separated into two strata, an upper spirituous one of two vols., and an inferior oily one of eighteen vols.

Of the three samples of castor oil examined the English expressed oil was more soluble in alcohol than either of the others.

Expt. 6.—One vol. of dark colored English expressed croton oil was mixed with one volume of alcohol sp. gr. 0.796 by shaking without any additional heat, an uniform

* I am indebted to Mr. Spencer, of Lamb's Conduit Street, for a bottle of this oil. He received it some years ago from the wife of the Governor of Tobago, on whose estate it was procured. Its color is reddish.

transparent mixture was obtained ; and no separation took place on standing for several weeks.

In the case of the amber colored East India croton oil a separation takes place on standing, as already stated (see *Expt. 2.*) Here then the solubility of croton oil in alcohol resembles that of castor oil, in the circumstance that both oils obtained by expression in London are more soluble in alcohol than the corresponding oils imported from the East Indies.

On what does this difference depend ? Does it arise from the differences in the qualities of seeds pressed, or from differences in the mode of preparing the oil ? On these points nothing definite can be stated. In the case of castor oil, the mode of preparation adopted in India is different to that followed in England. Here the oil is expressed in a warm room, and filtered.

An oil presser of Calcutta informed me that, in Calcutta, the expressed castor oil is heated with water, in a tin vessel, until the water boils, by which a scum forms on the surface, and that it is then strained. Dr. Ainslie, however, states that, in Southern India, it is prepared by decoction. In both cases, however, it is heated in boiling water ; and it does not appear improbable that heat may effect some change in the oil, or the hot water extract something from it, by which its solubility may be lessened. With a view of elucidating this point, I made the following two experiments :

Expt. 7.—Some English expressed castor oil was heated with water until the water boiled, and the ebullition was continued for several minutes ; but no visible change was effected in the mixture. No mucilage, or scum of any kind, separated from the oil, which remained as clear and transparent after the experiment as before. A portion of the oil, when cold, was mixed with an equal volume of rectified spirit, and the mixture shaken up ; it in a short time became clear and transparent. The solubility of the oil had

not, therefore, have been appreciably effected by the boiling process.

Expt. 8.—Some English expressed croton oil was heated with water, until the water boiled, and the ebullition was continued for several minutes. No visible change was effected in the oil, and no scum of any kind separated from it. When cold, a portion of the oil was mixed with an equal volume of alcohol, and shaken up; no heat being applied. The mixture became clear and transparent, and no separation had taken place in it at the end of two hours.

As far, therefore, as these two experiments go, they negative the supposition, that exposure to the action of boiling water lessens the solubility of either castor or croton oil in alcohol or rectified spirit.

With the fact of the unequal solubility of different samples of apparently genuine castor oil in rectified spirit, I have long been familiar; but I am indebted to Mr. Redwood for the information that a similar difference exists between the foreign and English croton oils.

In the *Edinburgh Pharmacopœia*, a note is appended to the oil of croton, stating that, when agitated with its own volume of pure alcohol, and gently heated, it separates on standing, without having undergone any diminution. I have never been able to verify this statement. Genuine croton oil, expressed by Messrs. Herring of London, forms, with an equal volume of alcohol, a perfectly transparent mixture, without being "gently heated," and does not again separate at ordinary temperatures. Mr. Redwood has verified the same fact with various samples of genuine croton oil, respectively expressed by himself, by Mr. Morson, by the Messrs. Herring, and by Messrs. May & Co., and he finds that no subsequent separation takes place, unless the mixture be subjected to artificial cold, as a freezing mixture, or to the atmosphere during a very cold night; and in that case the oil is found to have slightly increased in bulk, and the alcohol to have suffered a corres-

ponding diminution of volume. I presume, however, that the statement of the Edinburgh college is intended to apply to the amber colored East India croton oil. This oil, when mixed with an equal volume of alcohol, does not form a transparent homogeneous mixture until [a gentle heat is applied, and, on standing, the mixture separates into two strata—thus far agreeing with the statement of the Edinburgh college; but the oil, on separation, is found to have suffered a slight augmentation in bulk, and the alcohol a corresponding diminution (See *Expt. 2.*)

In the degree of its solubility in alcohol, the pale or amber colored East India croton oil agrees with jatropha oil, and Mr. Redwood has suggested that it is perhaps mixed with the latter oil.

It is obvious, from what has been now stated, that if English expressed croton oil were adulterated with castor oil, alcohol would be useless as a test to detect the fraud.

Leopold Gmelin states, in his *Handbuch d. Chemie*, vol. ii., page 458, 1829, on the authority of Stoltze, that benzoic acid promotes the solubility of castor oil in spirit containing seventy-five per cent of alcohol; and I have been informed that camphor is equally efficacious. I have not, however, verified either of these statements.

III. Castor and croton oils enable other fixed oils to dissolve in alcohol. This is a very interesting and important fact; and in illustration of it the following experiments are adduced. I may premise, however, that I have been accustomed for several years to demonstrate the fact in the lecture room.

If rectified spirit be substituted for alcohol a gentle heat is usually required to render the mixture transparent and homogeneous; and on standing the liquid, when cold, separates into two strata, an upper spirituous one holding oil in solution, and an inferior oily one retaining spirit in solution. The relative bulks of the two liquids are, however, very different to those of the spirit and oil originally mixed.

Expt. 9.—One vol. olive oil was mixed with two vols. of rectified spirit. When shaken the mixture remained turbid, and on the application of heat the two liquids separated apparently unchanged.

Expt. 10.—One vol. of olive oil, two vols. of castor oil, and two vols. of rectified spirit were mixed. The mixture remained turbid after shaking; but the application of heat a clear transparent homogeneous liquid was obtained. After some hours separation took place.

Expt. 11.—One vol. of olive oil, and five vols. of rectified spirit were mixed; the phenomena were the same as in the preceding experiment. After some hours separation had taken place.

Expt. 12.—One vol. of olive oil, two vols. of castor oil, and three vols. of alcohol were mixed. By shaking they yielded a perfectly clear, transparent, and homogeneous mixture.

Expt. 13.—One vol. of lard oil (the olein separated from lard by expression) was mixed with one vol. of rectified spirit; after shaking the mixture remained turbid; on the application of heat the oil and spirit separated, apparently unchanged in quantity.

Expt. 14.—One vol. of lard oil, two vols. of castor oil, and two vols. of rectified spirit were mixed. The mixture remained turbid on shaking; but on the application of heat a clear, transparent, homogeneous liquid was obtained. After some hours, however, separation took place.

Expt. 15.—One volume of lard oil, four volumes of castor oil, and five vols. of rectified spirit were mixed. The mixture was turbid after shaking, but became clear, transparent, and homogeneous when heated. Separation, however, took place after some hours.

Expt. 16.—Sixty-seven parts of castor oil and sixty-seven parts of rectified spirit were mixed. By shaking, a clear homogeneous mixture was obtained. In twenty hours no change or separation had occurred. Six vols. of

lard oil were now added, and the mixture well shaken. In a short time, and without the use of heat, a perfectly transparent homogeneous mixture was obtained. On standing, however, fourteen vols. of a spirit, holding some oil in solution, separated.

Expt. 17.—Two vols. of English expressed croton oil, one vol. of olive oil, and three vols. of alcohol, were mixed together. By shaking, a transparent homogeneous mixture was obtained.

In other experiments, which I need not here enumerate, I find that castor oil enables nut oil, (the expressed oil of *Arachis hypogæa*,) jatropha oil, (the expressed oil of *Curcas purgans*,) and anda oil (the expressed oil of *Anda brasiliensis*,) to dissolve in rectified spirit.

The various facts now detailed seem to me to be best explained by supposing that both castor and croton oils, contain some principle which confers on their fatty oil the power of dissolving in alcohol, and that this principle does not exist in all samples of these oils in the same proportional quantity, and hence the different samples are unequally soluble in alcohol. The same principle enables other fixed oils to dissolve in alcohol when they are mixed with either castor or croton oil.

Moreover, if we were further to assume that the quantity of this solvent principle, in both castor and croton seeds, increases the longer the seeds are kept, we should have a ready explanation of the greater solubility of castor and croton oils expressed in England, from seeds brought from India, and which are often musty, than of those oils expressed in India from fresh seeds.

In the *Edinburgh Pharmacopœia* it is stated that castor oil "is entirely dissolved by its own volume of alcohol." The statement is quite accurate; but if it is made as a guide to enable us to determine the purity of the oil, it is perfectly useless, for English expressed castor oil adulterated with

33 per cent. (or in some cases with 50 per cent.) of another fixed oil, dissolved by its own volume of alcohol.—*Pharmaceutical Journal*, May, 1850.

ART. LIII.—ON CANTHARIDIN, AND ITS PHARMACEUTICAL PREPARATIONS.

BY DR. OETTINGER.

In 1841 I expressed my opinion that cantharidin is the only constituent contained in the cantharides which possesses blistering power, that the cantharides in substance are, therefore, not all required for blistering, and that a cantharidin taffeta not only fully supplies the place of the Spanish flies, but is even preferable to them.—(*Jahrb. d. ärztl. Ver. in München* III. Jahrg. 1841.) At that time I published a method of preparing a vesicating taffeta, which answered all the technical and dynamical purposes of a blister, and which has been practically substantiated in thousands of cases. The usefulness of this remedy soon manifested itself in Germany by its universal application, but still more by the attempts of apparently improving upon my method of preparation. The proposal of spreading the mass upon paper instead of taffetas, was considered by many not only an essential improvement, but even as a sufficient claim for obtaining a patent.

In the year 1847 I was induced to read to the Medical Society in Munich (*vide* Med. Corresp. Bl. bayer, Aerzte, 1847, p. 813,) and a year after to publish, an account of my experience of this preparation during nine years, and to show that it is perfectly indifferent with regard to the effect, whether the cantharadin be employed in a pure state, or mixed with the green and waxy resin; and whether it be spread on taffetas, linen, or paper. At the same time I also

minutely explained its physiological and therapeutical effect.

In this paper I shall give an account of a solution of cantharidin which serves as the basis of various blistering preparations, and also describe a new vesicating substance containing cantharidin, namely, the *collodium cantharidale*.

Cantharides when treated with ether, yield the *oleum cantharidum viride*—consisting of cantharidin, green oil, and waxy resin; the first, by the separation of the two latter substances, becomes pure cantharidin. This operation, however, is tedious and expensive, and is attended with a considerable loss of active matter, without an augmentation of the blistering power, but with a great increase of price. We employ, therefore, for the purpose of blistering, the *ol. canth. vir.*, which is obtained most easily, and in the greatest abundance by means of ether. This extract readily combines with resins, fat, and collodium, and may be admitted into the *Materia Medica* under the denomination of *ether cantharidalis seu vesicans*. If applied twice without any admixture, by means of a hair pencil, it produces in children after one or two hours, and if three times applied in adults in three or four hours, abundant blisters, which are treated in the same way as those produced by the ordinary blistering plaster. The ether evaporates speedily after the application, and the remaining fixed *oleum cantharidin viride* operates like the cantharides in substance.

Preparation of the ether cantharidalis.

℞ Cantharid. rudit. pulv.	part. unam.
Ether. sulphuric.	partes duas.

Digere per tres dies et exprime.

In somewhat larger quantity the *ol. canth. vir.* is obtained by employing Real's press, or the displacement apparatus, (as Ostermyer does here,) or Mohr's apparatus. The preparations composed of *ether canthar.* obtain according to the addition of excipients a different form, namely:

1. *Taffeta vel charta vesicans s. cantharidalis.*

Taffetas (marceline,) stretched on a frame, or paper on a board, is to be painted over twice at proper intervals with an aqueous solution of isinglass; when perfectly dry the liquor cantharidalis—prepared in the following manner, is to be spread over it:

℞ Ether. cantharidalis.

Ether. sulphur. aa. ℥j.

Terebenth coct.

Colophon, aa. ʒji.

Misce et solve.

A painter's brush, moderately moistened with the solution, and softly pressed against the brim of the vessel, is then passed at short intervals, and always in the same direction, twice over the stretched material—in twenty-four hours once more—and again after twenty-four hours for the fourth time. In order to prevent the agglutination of the preparation, it is coated after a few days with a fresh solution of isinglass that has already commenced to congeal. The taffeta and the paper are equal to one another in effect, only that the latter is cheaper by a fourth. Before applying the plaster it should be wiped with a wet rag in order to remove the last applied coating of isinglass.

2. *Unguentum vesicans s. cantharidale.*

This ointment, prepared after the Prussian pharmacopœia, is, as I have before stated, indispensable in the treatment of children. After three or four applications it produces within three or four hours abundant blisters, which entirely disappear in a few days. If prepared with equal parts of *ether cantharidalis* and fat, it operates after two or three applications within two hours equally intensely, but quicker and more sure. Half a scruple of *ether cantharidalis* and the same quantity of hogs' lard are sufficient for a threefold application upon a surface as large as a crown piece.

3. *Collodium vesicans seu cantharidale.*

Ether cantharidalis and gun-cotton in substance or solution (collodium) offer a very remarkable vesicant. The *ol. cantharid.* operates as blister, and the ether rapidly evaporating, the collodium dries within a few moments and forms a coating.

The formula given by Dr. Ilisch in St. Petersburg, the inventor of the collodium cantharidale, has already appeared in the *Pharmaceutic Journal*, for September, 1849. Its efficacy has been proved by repeated experiments made by Balbiani and Basse.—*Pharmac. Central Blatt*, 1849, No. 7.

These statements I must correct in so far, that by the above-mentioned operation a saturated solution of cantharidin in ether with green oil, and waxy resin—*viz.*, the *ol. cantharidum viride*, is obtained, and not of cantharides; there is also no use in employing acetic ether, since sulphuric ether fully answers the purpose.

Dr. Rapp, who first introduced the collodium cantharidale into Germany, expresses himself in the following manner: "Recently medicinal substances have been combined with collodium for endermic application. This object can only be obtained by volatile substances, which combine with collodium, and readily dry, but which, notwithstanding their volatile nature, are still absorbed under the coating of collodium and act upon the epidermis. Such a substance is cantharidin; this liquid thinly applied with a brush upon any part of the body, dries in a few seconds, and protects this part with a coating like goldbeater's skin. The skin surrounding the periphery of the painted place reddens in children within two or three hours, with adults within five or six hours, accompanied by a burning sensation: gradually the coating, consisting of collodium, rises, and after a few hours a blister is formed, which extends a few lines beyond the whole periphery. On this part, which was not covered with collodium, the blister is opened; the collodium

coating which cannot be removed, remains in its place, and thus protects the sore place, dispensing with the use of ointment." This practical communication of Dr. Rapp deserves to be universally acknowledged.

Ether cantharidalis, prepared after my prescription, is a suitable constituent of all preparations of cantharidin, and is perfectly adapted for preparing the *collodium cantharidalis*. Instead of dissolving gun-cotton in it, I prefer a mixture of equal parts of *ether cantharidalis* and collodium, and rather apply it twice instead of once on the place to be blistered. Since the publication of Rapp's method, I employed it, prepared after my prescription, in about twelve cases, with the best effect. Two scruples of this *collodium cantharidalis* were generally equal to four drachms of the common blistering plaster.

The reason why I have modified Illsch's method of preparing it, is that his preparation is too strong for children, and that the quantity of cantharidin contained in it can neither be increased or diminished, whilst, according to my prescription, the collodium can be added at discretion; and for children I actually took only one part of *ether cantharidalis*, and two parts collodium. Finally, I consider my method preferable with regard to technical purposes; *ether cantharidalis* and collodium are always ready, and the whole does not require to be purposely prepared, and on depending parts of the body the *collodium cantharidale* flows down before it has become dry, and does, therefore, not supply, in this case, the place of taffeta vesicans.—*Pharmaceutical Journal*, March 1, 1850.

ART. LIV.—ON SALEP.

BY DR. X. LANDERER.

The enormous quantities of salep root which are every year brought from Macedonia, chiefly from about Janina, to Greece and the whole of the East, induced me to obtain some information respecting this important substance.

In all parts of the kingdom of Greece, but particularly in the plains between Nauplia and Argos, in Messinia many sorts of orchis are found, and amongst these, *Orchis pyramidalis*, on hills in Messenia and Lukonia; *Orchis mascula* on the Parnassus, in Arcadia, in Argolis; *Orchis longiflora* and *O. variegata* in all parts of Morea; *O. undulatifolia* in Messenia; *O. sambucina* in Elis; *O. nigra*, *O. maculata*, *O. conopsea*, in the islands, &c.

From all these species the tubers are carefully collected, but on account of their disagreeable smell and the mucilaginous and unpleasant taste of the decoction, they are very little used, so that only the poorest class of inhabitants gather and employ them for domestic purposes. The Grecian salep is not an article of commerce. Commercial salep comes from Macedonia, from the fruitful valleys and the evergreen mountains about Janina, from Sagona, Tempe, &c.

The species of orchis found in these parts of Epirus, are *O. pyramidalis*, *O. mascula*, and *O. Morio*. Without the least attention and care having been paid to the culture of these plants, extensive tracts of land and mountains are seen at the commencement of the spring, in the months of February, March, and April, covered to the top with orchis plants. This luxuriance is said to be principally caused by the annual digging up of the soil. The more severe the winter has been, and the snow has covered the mountains during the winter months, the more abundant is the salep crop: it is also stated to have been observed that a larger

consumption of the salep root is followed by a larger produce of it, as the people are thus compelled to turn up the soil, by which the development of the small tubers is much promoted.

After the inflorescence, namely, in April and May, the crop begins, and lasts till August. For this purpose, the soil is turned up to the tops of the mountains, the tubers picked out, and the ground again made flat. The tubers are now repeatedly washed in a running water, and the smaller separated from the larger ones. The first are strung on thread by women and children, and quickly dried in the sun. The tubers which come from these parts to Greece, are scarcely as large as a pea, and are generally of a much darker color than those not strung upon thread, which are sold for double price. These latter are said to retain their white color by being quickly dried in a baking oven, by which they acquire a horny character, which is imparted to them by merely quick drying, and not, as stated in pharmaceutical works, by being previously dipped in boiling water. Whether this immersion is customary in Persia or not, I cannot say with certainty, the *Saleptides* in Constantinople, who import their salep from Persia, do not mention anything of the kind.

Some roots possess a somewhat saline taste, which proceeds, however, not from their having been dipped in salt water or sea water, but from the soil where they grow, for the various sorts of orchis thrive very well on the coast. The salep imported from Persia, which is sold in the bazaars of Smyrna and Constantinople, and which is at the same time distinguished for its whiteness and corneous appearance, is particularly said to have a very saline taste. In the East, however, where the consumption is greatest, this sort is not liked, and, therefore, the Macedonian kind is preferred.

The collectors pay particular attention to those plants with blue blossoms, as they consider the root to be "the

male salep," which, in their opinion, possesses a greater medicinal power, and is, on this account sold much dearer. When the bulbs are perfectly dry, they are placed in sacks, and sent to the East for sale.

The salep is in great reputation among the Turks as a strengthening medicine, and is used throughout Greece in affections of the bowels and respiratory organs. The decoction of salep, or rather the gelatine salep, is prepared in the following manner by persons who are called in Greece and the whole of the East, *Saleptsides*:—

The salep is ground by means of handmills into a fine powder, then stirred up with water, and boiled into a stiff jelly, which is sweetened with honey. Some *Saleptsides* add also a small quantity of cyprus-root, in order to make it slightly acrid.

After midnight these men go to work, and with day-break they are heard crying "*Salep! Salep sestom!*" *i. e.* hot salep, which is taken against cough, &c., not only by the poor, but also by others. The salep jelly is carried about in large tin vessels, and kept hot by coals underneath. About eight o'clock in the morning the whole troop of these *Saleptsides* disappear all at once, and betake themselves to their huts in order to issue again from thence with the following daybreak.—*Pharmaceutical Journal*, March 1, 1850.

ART. LV.—ON A NEW REAGENT FOR DETECTING THE PRESENCE OF SUGAR IN CERTAIN LIQUIDS, AND ESPECIALLY IN URINE.

BY M. MAUMENÉ.

Several processes have been described by chemists for the detection of sugar, even under the singular circumstances of diabetic disease. Unfortunately none of the pro-

cesses is of such simple execution as to be readily adopted by the medical profession. I now present chemists and physicians with a test-paper, or rather tissue, by means of which the presence of the smallest quantity of sugar can be detected in an instant.

The action of chlorine upon sugar is very imperfectly known, and the experiments which I have made with the endeavor to throw some light upon this question have made known numerous inaccuracies in the statements made by the most celebrated chemists. Thus, whatever M. Liebig may state to the contrary, chlorine acts, even in the dry state, upon sugar; it does not require a temperature of 212° to determine the reaction. At the ordinary temperature it requires more time. In all cases there is formed a brown substance, which is partly soluble in water—a caramel, which is of a brilliant black color when dried. What is obtained with chlorine is obtained as easily, if not more so, with the chlorides, and especially with the perchlorides.

All the sugars behave like cane-sugar towards the chlorides; they all experience this dehydration, the result of which is the brownish-black product. And this is not all; as might have been foreseen, the substances of analogous composition to that of sugar, and which like it may be represented by carbon and water, equally experience the same kind of alteration. Lignine, hemp, flax, cotton, paper and starch are thus circumstanced.

From these facts we learn the conditions under which we must place ourselves in order to obtain a paper, or rather solid band, coated with a reagent capable of detecting the presence of sugar. Let us suppose, in fact, a slip of solid substance, which is not altered by the chloride of tin even at a high temperature; cover this substance with a layer of chloride by immersing it in a concentrated solution and desiccation; then dip the strip thus prepared in a very dilute solution of sugar, and expose it to a temperature of 266° – 300° F. The part which has been immersed will

immediately change color, and will become of a brownish-black more or less deep.

As it is impossible to use paper, linen or cotton, some woollen tissue, for instance a white merino, may be employed. After having dipped the merino for three or four minutes in an aqueous solution of bichloride of tin (the oxymuriate of commerce, $\text{SnCl}_2 \cdot 5\text{HO}$.) made with 100 grms. of bichloride and 200 grms. of ordinary water, let the liquid drain off, dry the merino in a piece of the same substance on the water-bath, and the reagent is prepared. It is cut into strips, like the ordinary test papers.

By means of this chlorinated merino, the physician will be able, without the least difficulty, to determine whether the urine of a patient contains an appreciable trace of sugar. It will be sufficient to pour one drop of the urine upon one of these strips, and to hold it over a piece of incandescent charcoal, the flame of a lamp or of a candle, to produce in an instant a very visible black stain. The sensitiveness of the test is enormous; 10 drops of a diabetic urine, added to 100 cubic centimetres of water, furnish a liquid which turns the chlorinated merino completely brownish-black. Ordinary urine, urea and uric acid are not colored by the chloride of tin.—*Chem. Gazette*, April 15, 1850, from *Comptes Rendus*, March 18, 1850.

ART. LVI.—ON THE ADULTERATION OF ISINGLASS.

BY THEOPHILUS REDWOOD, Esq.,

Professor of Chemistry and Pharmacy to the Pharmaceutical Society.

I have recently been engaged in the examination of specimens of some of the isinglass now met with in commerce, which, from the price at which it has been sold, was suspected to be adulterated. The subject, previously to its

being submitted to me, had been, to a certain extent, investigated by Mr. Warrington, of Apothecaries' Hall, whose report to Messrs. Banks and Eland, of Bridge Street, Westminster, on two specimens, one of which was suspected, is as follows:

"Apothecaries' Hall, April 8th, 1850.

"MESSRS. BANKS and ELAND,

"GENTLEMEN,—I have submitted the two samples of isinglass forwarded me on the 27th ultimo to a careful examination, and beg to report as follows:

"No. 1.—Hand cut, marked Simpson and Humphrey, appears to be a perfectly pure and genuine isinglass, yielding a very firm jelly of good color and quite free from any unpleasant flavor or odor.

"No. 2.—Hand cut, marked Dawson and Morris, on the contrary, is, in my opinion, a very inferior article. It has a great deal of acid adhering to it, which, I consider, must arise either from acid having been used for the purpose of improving the color and appearance of an inferior isinglass so as to render it saleable, or from its admixture with a gelatine which had been prepared by means of an acid; in either case imposing both on the dealer and the consumer. The jelly from this is firm and pretty good in color, but it is acid, has a faint sickly odor, as though the material from which it was made had become slightly putrescent, and the flavor partakes of the same sickly character, which is very disagreeable. Trusting these results will prove satisfactory,

"I remain, yours respectfully,

"ROBERT WARRINGTON."

The suspicion which had been entertained having been thus strengthened, and the nature of the adulteration indicated, it appeared very desirable to have more direct evidence upon the subject, not only with the view of proving a fraud which there was reason to believe was extensively practised, but, at the same time, to enable the dealers in

isinglass to protect themselves and the public against imposition, and to exonerate those who have not participated in this newly discovered branch of the system of adulteration which has become so general. With these views I undertook a few experiments, and although there has not yet been time to complete the investigation, I am induced to publish the results in the hope of their being practically useful.

Of the several varieties of isinglass, which, in the unmanufactured state, are imported into this country, that called *Beluga leaf* is most esteemed for dietetical use, and this, when prepared and cut, constitutes the best Russian isinglass of the shops. There are inferior varieties of Russian isinglass, such as the *Samovey*, which, being much cheaper than the *Beluga*, may perhaps be sometimes mixed with it when cut, but as the jelly made from such deteriorated specimens would be proportionately weak, the admixture would be thus detected.

Brazilian isinglass is a cheap kind, which is extensively used for fining beer and other similar purposes, and this is also prepared and cut, like Russian isinglass, and is no doubt sometimes mixed with the Russian. The Brazilian variety, however, is much less soluble in water than the best Russian, and the jelly obtained from it is inferior in consistence, in transparency, and in flavor.

When these different kinds of isinglass have been submitted to the processes of the manufacturer, in which they are picked and purified (especially the inferior kinds,) rolled into *ribbons*, and subsequently cut, the prices at which they are sold, wholesale, vary from six shillings to seventeen shillings a pound. The modern introduction of machinery has enabled the manufacturer to prepare the isinglass in much thinner shreds than was formerly the case when it was pulled to pieces by the fingers or cut with the scissors. There are those, however, who still prefer to have it in the thicker pieces, in which state it is called *hand cut*.

The quality of cut isinglass is estimated, 1st, by its color, that which is cut fine by machinery being, *cæteris paribus*, the whitest and generally most esteemed; 2dly, by the smell emitted after breathing upon it, that being the best which is least disagreeable in this respect; 3dly, by the extent of its solubility in water; and, 4thly, by the consistence, transparency, and flavor, of the resulting jelly. This practical method of examination is that alone by which slight shades of difference may be discovered, yet a difference of flavor which only a practised palate, or careful comparison with an approved specimen, could detect, is often important in an article intended for the diet of the fastidious invalid, and a slight superiority in this respect, will, therefore, command a much increased price.

There is no substance that affords so pure and good a jelly as the best Russian isinglass; but gelatinous substances are obtained from other sources, and for several years past have been sold as substitutes for isinglass under the name of *gelatine*. The gelatines of commerce are prepared, either from the skins of animals, or from bones. The jelly made from some of these substances is nearly as firm as that made from isinglass, and although it has more or less of a sickly flavor, sometimes strongly resembling that of glue, yet it must be admitted that the manufacture of gelatine, especially that made from bones, has been greatly improved, so that in color, solubility in water, and gelatinising power, it is almost equal, although in flavor decidedly inferior, to the best isinglass. The sheet gelatine is sold, wholesale, at fifteen pence a pound.

Solutions of good gelatine, and those of isinglass, give similar reactions with the tests usually employed in the examination of gelatinous substances; it became necessary, therefore, to find some characters, other than those usually relied upon, by which to detect the presence of gelatine when mixed with isinglass.

Specimens of the best Beluga leaf and staple isinglass,

uncut, from the museum of the Pharmaceutical Society, and others obtained from the house of Simpson and Humphrey, were used in determining the characters of this substance.

In making the corresponding determination with reference to gelatine, specimens were used of the cut and uncut gelatine, as met with in commerce, including Nelson's opaque and transparent gelatine, and the French gelatine, commonly called *grenatine*.

Action of water on isinglass and on gelatine.—If *cut isinglass* be macerated in cold water, it will assume an opalescent appearance, becoming more opaque than it was previously to its immersion. The shreds, although they swell and soften, will retain their integration. On examining thin slices under the microscope, they present the appearance of a fibrous structure. 2. If *cut gelatine* be macerated in cold water, it will assume a transparent appearance, this effect increasing with prolonged maceration. The shreds will swell up and soften, and ultimately become disintegrated. On examining a thin slice of the softened gelatine under the microscope, it does not present the appearance of a fibrous, but rather of a flaky, structure.

Action of solution of caustic potash on isinglass and on gelatine.—1. If *cut isinglass* be macerated in cold solution of caustic potash (liquor potassæ of the Pharmacopœia,) it will speedily become transparent; and after a lapse of a few hours, if occasionally stirred with a glass rod, it will be dissolved, forming a clear and colorless solution. After allowing the solution to stand for some time, a *very slight* flocculent precipitate will be deposited, which, in operating on twenty or thirty grains of the isinglass, will be scarcely perceptible. 1. If *cut gelatine* be macerated in cold solution of caustic potash it will become opaque; even those specimens which were so, to a certain extent, previously, will assume increased opacity after their immersion. The gelatine will ultimately dissolve, as does the isinglass, but the solution will not be transparent, and after standing for some time, a

very slight flocculent precipitate will be deposited, which, in operating on twenty or thirty grains of the isinglass, will be scarcely perceptible. 2. If *cut gelatine* be macerated in cold solution of caustic potash, it will become opaque; even those specimens which were so, to a certain extent, previously, will assume increased opacity after their immersion. The gelatine will ultimately dissolve, as does the isinglass, but the solution will not be transparent, and after standing for some time, a *copious* flocculent precipitate will be deposited.

Inorganic constituents of Isinglass and of Gelatine.—1. On carefully incinerating isinglass in a platinum crucible, an ash of a *reddish color* is obtained, amounting to .5 per cent., ($\frac{1}{2}$ a grain in 100.) This ash consists principally of carbonate of lime. 2. On incinerating gelatine, as above described, a *voluminous white ash* is obtained, amounting to 3. per cent., (3 grains in 100.) This ash, like the former, consists principally of carbonate of lime. Three per cent. is the smallest amount of ash obtained from any of the specimens of gelatine operated upon, but some specimens yield more.

Having thus ascertained that there are several characters, besides those of taste and smell, by which isinglass may be distinguished from commercial gelatine, I proceeded to examine a specimen of isinglass obtained from the same source as that referred to in Mr. Warrington's report, and which was suspected to be adulterated.

1. A portion of the specimen was macerated in cold water. After standing for about two hours, the swelled and softened shreds were examined under the microscope with a low power, and they were found to consist partly of an opaque fibrous substance, resembling genuine isinglass, and partly of transparent flakes, resembling gelatine. In some of the pieces these substances were seen to form distinct strata, running parallel to each other; but in others they were more confusedly interstratified, or the strata completely broken,

and only patches of the transparent part appearing here and there. In some of the pieces the separate strata could be distinctly seen with the naked eye.

2. Some of the specimen was macerated in cold solution of caustic potash. It became less transparent than genuine isinglass would be under similar circumstances. After allowing it to stand for some hours, it dissolved, forming a slightly turbid solution, from which a flocculent precipitate was deposited, which was much greater than that formed in genuine isinglass.

3. Some of the specimen was incinerated; it yielded an ash whiter and more voluminous than that of genuine isinglass, amounting to 1.5 per cent., ($1\frac{1}{2}$ grains in 100.) This ash consisted principally of carbonate of lime.

It was evident from these results that the specimen under examination consisted of a mixture of isinglass and gelatine, and the optical examination showed that the two substances had been worked together in a manner well calculated to elude detection. I felt satisfied, and Mr. Warrington had previously expressed the same conviction, that sheet gelatine had been rolled between two sheets of isinglass, in the moistened state, so as to form a ribbon, in which the two substances would be united.

In order to get further evidence in confirmation of this view, I applied to Mr. Vickers, proprietor of the house of Simpson & Humphrey, of Little Britain, who is an extensive manufacturer of cut isinglass, and who having been a sufferer from being undersold by the manufacturers of the adulterated article, expressed a willingness to render me any facility that his manufactory could afford for elucidating the subject. I accordingly had some genuine isinglass and sheet gelatine in the proportion of three parts of the former and one of the latter, rolled into ribbon and cut, under my inspection. The specimen thus prepared could not be distinguished by the eye from the best Russian isinglass. It agreed entirely with the adulterated article met with in commerce.

not only in appearance, but in the characters presented when examined in the manner already described.

I feel fully justified therefore in the conclusion I have drawn, that a most ingenious but unwarrantable system of adulteration is adopted in the manufacture of cut isinglass, and I trust that this exposure will enable those who deal in isinglass to detect the imposition, if its practice should be continued.—*Pharmaceutical Journal*, May, 1850.

ART. LVII.—ACTION OF NITRIC ACID ON RHUBARB; AND PRODUCTION OF A NEW COLORING MATTER, ERYTHROSIN.

By M. GAROT.

On adding four parts of nitric acid to one part of coarsely-powdered rhubarb, in a wide-mouthed, stoppered bottle, a brisk reaction speedily takes place, accompanied by the disengagement of nitrous gas, elevation of temperature, and swelling up of the mixture. This reaction commences almost immediately with indigenous rhubarb, but less energetically with the foreign varieties. A temperature of from 60° to 70° Fah., however, is necessary to commence the action.

After leaving the ingredients in contact for two days, the foreign rhubarb acquires a pulpy consistence and orange yellow color, the acid being almost entirely absorbed by the solid residue. The indigenous rhubarb, on the other hand, assumes the condition of a bright chrome-yellow pulp, floating on an acid liquor.

On diluting the mixtures with a large quantity of water, straining through cloth, washing, pressing, and drying the solid residues, there remains from the indigenous rhubarb, a bright yellow, and from foreign rhubarb, an orange-

colored powder. Indigenous rhubarb yields from 8.5 to 10 per cent., and foreign rhubarb from 15 to 20 per cent. of this product.

The author proposes the name *Erythrosin* for this product, in consequence of the property it possesses of being reddened by alkalis.

Properties of Erythrosin.—After being dried, erythrosin is in the form of a yellow or orange agglomerated powder, which acquires a shining appearance on being pounded in a mortar. It is perfectly tasteless; the odor slightly aromatic and nitrous, arising probably from the presence of a little nitrous acid in combination, which washing will not remove.

Action of Heat.—When exposed to the action of heat in a glass tube, abundance of yellow vapors of rhabarbaric acid are given off, which condense into a yellow crust on the sides of the tube, and leave a white residue of lime, which is more abundant in the erythrosin from foreign than from indigenous rhubarb.

Action of Water.—Cold water has but little action on erythrosin, merely acquiring a slight yellow color; but if it be boiled, the liquid acquires a reddish amber color, and becomes slightly acid. This acidity appears to arise from the presence of a little nitric acid, not previously removed by the washings; for it cannot be attributed to rhabarbaric acid, the quantity of which is so small, as scarcely to redden potash. When evaporated to a certain extent, the liquor deposits a gelatinous matter having all the characters of pectin.

Action of Alcohol.—Cold alcohol has little action upon it: it acquires an amber color, which becomes deeper on the application of heat, and finally assumes the reddish-yellow color of Malaga wine. After treating it seven or eight successive times with boiling spirit, all soluble matter is removed, and the solutions all redden litmus paper.

On evaporating the alcoholic solution, a yellow flocculent

deposit is formed, together with a crystalline pellicle over the surface; but no crystals are deposited on cooling. A dry product is obtained by evaporating all the spirit away, and this is in the form of a granular powder of a brownish yellow color, having some resemblance to Spanish tobacco. It has a slightly aromatic odor, and a mucilaginous and slightly acid taste, quite different from that of rhubarb.

This substance is entirely dissolved by repeatedly treating it with hot alcohol. On evaporating the solution, a granular substance of a sulphur yellow color is obtained, the surface of which acquires an orange tint, from exposure to the air.

This substance possesses all the physical and the principal chemical characters attributed by Brandes to rhabarbaric acid, and by Geiger to rhabarbarine.

The erythrosin of indigenous and of exotic rhubarb afford products which are perfectly identical, excepting that that of indigenous rhubarb yields a larger proportion of the rhabarbaric acid.

Erythrosin of indigenous rhubarb yielded :—

Rhabarbaric acid	85.0
Insoluble matter	15.0
	<hr/>
	100.0

Erythrosin of exotic rhubarb yielded :—

Rhabarbaric acid	60.0
Insoluble matter	40.0
	<hr/>
	100.0

Action of Ether.—From the action of Ether on the substance dissolved by alcohol, it might be inferred that it is a perfect solvent for rhabarbaric acid. It exhausts erythrosin entirely of that principle when aided by the application of heat.

Action of Alkalis.—When erythrosin is brought into contact with the alkalis, it immediately acquires an intense

purplish-red color. It is this combination which is most deserving of attention, on account of the beauty of the color produced, which may probably admit of application in the arts.

If one part of caustic potash be added to two parts of erythrosin, and thirty parts of water, a purplish-red solution will be obtained, which will have acquired its full intensity of color after standing for a few days. After filtering the liquor through cotton, it may be kept for a month without alteration, and may be used as a coloring agent. In fact, one part of erythrosin will thus afford as much color as six parts of cochineal. If a few drops of the alkaline solution be added to a piece of chalk or magnesia, it will be absorbed, and will form a rose-colored powder, as bright as if colored with carmine.

Erythrosate of Ammonia, after driving off the excess of ammonia, possesses the same properties as the potash salt; but its coloring power is more than four times greater. It may be advantageously used for coloring soaps, and for other similar purposes.—*Pharmaceutical Journal*, May, 1850, *from Journal de Pharmacie*.

ART. LVIII.—ON THE FORMATION OF ASPARTIC ACID FROM BIMALATE OF AMMONIA.

BY M. DESSAIGNES.

We are indebted to M. Piria for the knowledge of the interesting fact, that asparagine, and aspartic acid, submitted to the oxidizing action of nitrous gas, disengage nitrogen, and leave a residue of malic acid. He thus demonstrated by analysis that these two substances may be considered as amides of malic acid, corresponding for instance to oxamide and oxaminic acid. If this be the case, we ought to be able to reproduce asparagine and aspartic acid by synthesis.

The action of ammonia upon malic ether, when a method shall have been discovered for preparing this ether, ought to produce asparagine. I have not been more fortunate than my predecessors in my endeavors to obtain malic ether; but I have succeeded in preparing aspartic acid from, the bimalate of ammonia.

When this salt is heated to between 320° and 392° in an oil-bath, it melts, puffs up, and disengages some slightly ammoniacal water. The residue is a transparent, resinoid, reddish mass, which dissolves but very sparingly even in boiling water. By repeated washing with hot water, an amorphous pulverulent matter, of a pale red color and an earthy taste, is obtained. It is a new nitrogenous acid, differing in all its reactions from aspartic acid. It is a very stable substance, and dissolves in hot concentrated acids, from which it is precipitated by an addition of water unaltered, even after ebullition, for some minutes. But if heated for five or six hours with nitric or hydrochloric acid, it undergoes a remarkable metamorphosis. The reaction is terminated when water added to the acid solution no longer causes a precipitate. The solution, evaporated to dryness in the water-bath, left a brown, very acid, crystalline residue, which is a combination of hydrochloric acid and an organic substance. This compound is readily purified by means of charcoal, and is obtained in beautiful colorless crystals. It was dissolved in a pretty large quantity of boiling water, and the solution divided into two equal parts one of which was accurately saturated with ammonia, and the other part then added. On cooling, a quantity of minute brilliant prisms separated, which are aspartic acid. This acid does not exhibit the same crystalline form as the aspartic acid derived from asparagin; but the salts which it forms with lime, soda and the oxides of copper and silver crystallize with the same form as the corresponding aspartates; and I have convinced myself by analysis that they contain the same amount of base. I have also submitted

the isolated acid to direct analysis, and have obtained the same numbers as those furnished by the combustion of aspartic acid.—*Chemical Gazette*, April 15, 1850, from *Comptes Rendus*, March 18, 1850.

ART. LIX.—ON THE PURIFICATION OF DRINKING WATER.

Of the various important topics which have been brought under discussion in connection with the metropolitan water supply, not the least important is that which relates to the depuration of the water furnished by the several companies to the inhabitants of this great metropolis. We propose, therefore, on the present occasion, to take a general survey of the various possible methods of effecting the purification of water, and then to consider which of them are practicable and necessary to be adopted by the metropolitan water companies.

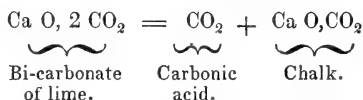
Water may be purified by *subsidiation and decantation*, by *filtration*, by *ebullition*, by *distillation*, by *clarification* or *fining*, and by the *addition of certain chemical agents*, which effect a chemical change in the composition of the fluid. Of course some of these methods are practicable on the large scale, but it appears to us to be desirable to examine the whole subject, and to notice also those which, though not applicable to public companies, have been, or still are, practised by individuals on the small scale.

1. *Subsidiation and Decantation.* The depuration of water is greatly aided by repose, by which various suspended or mechanical impurities are allowed to subside gradually, and from these the supernatant water is drawn off. Tanks, cisterns, and reservoirs become, therefore, important depurating agents. All the metropolitan water companies are provided with large deposite reservoirs in which this form of purifica-

tion goes on; and most houses are supplied with tanks, cisterns, or water-butts, which may be regarded as deposit reservoirs on a small scale.*

The purification of water by subsidence and decantation is the simplest of all modes of depuration; but unfortunately it is a very slow one. M. Leupold states that the water of the Garonne, taken when the river is swollen, does not recover its natural limpidity by ten days of perfect repose. The coarser impurities very quickly subside; but the finer matters are deposited very slowly.

During the time that deposition is going on, the water is exposed to the atmosphere, and in consequence suffers some chemical change. The bi-carbonate of lime, which it holds in solution, undergoes decomposition, half of its carbonic acid is evolved, and chalk or simple carbonate of lime deposited.



In this way the atmosphere aids in softening those waters which owe the whole or part of their hardness to bi-carbonate of lime. The atmosphere, however, is a source of contamination, as well as of purification. This must be very apparent when we take into consideration the immense quantity and variety of foreign bodies, inorganic as well as organic, contained in it. Ehrenberg tells us that, exclusive of inorganic substances, he has detected no less than 320 species of organic forms (*Polygastrica*, *Pytolitharia*, *Polythalamia*, and soft vegetable parts) in the dust of the winds; and it is obvious, therefore, that waters which are chemically very pure, would become contaminated by a prolonged retention in the deposit reservoirs.

* Sir William Clay says, that there cannot be less than from 30,000 to 40,000 cisterns in the district supplied by the Grand Junction Water Company.

By those who advocate the superiority of a continuous over an intermittent supply of water, the inconveniences and expense of cisternage have been forcibly pointed out; and it has been argued that by the adoption of a constant supply, the necessity of reservoirs in private houses would be got rid of. This, however, is a fallacy. Cisterns or other reservoirs would still be required, on account of the inevitable interruptions of supply arising from repairs to the mains and service pipes, alterations, extensions, and other causes. At the present time these are sufficiently numerous and annoying;† but they would in all probability be considerably augmented if the mains and service pipes were kept constantly charged; as the bursting of pipes from frosts would then be of more frequent occurrence; and the slightest repair to a service pipe would require the interruption of the supply to a street, or, perchance, to a district.

Moreover, in the cases of those companies which do not filter the water they supply, house cisterns are absolutely required as deposit vessels, as the water furnished is occasionally turbid and muddy, and quite unfit for immediate use. This statement applies to the New River Water, which is one of the best of the unfiltered Metropolitan waters. Although it is conveyed many miles by an aqueduct, which to a certain extent may be regarded as a deposit reservoir, and is afterwards allowed to deposit in the proper reservoirs at the company's works, yet at certain seasons, as after heavy rains, the water supplied by the company is very turbid, and does not recover its limpidity after two or three days' retention in the house cistern.

2. *Filtration*.—This process has for its chief object the

† The total number of interruptions which occurred in the year ending September 30, 1849, to the tenants of the Grand Junction Water Company was 2316, being an average of 6.34 per day, Sundays included. The average time during which the water was shut off was from half-an-hour to six hours, according to the character of the works required.

separation of the mechanical impurities of water; that is, of those foreign bodies which are suspended, not dissolved, in water. But under certain circumstances, filtration becomes a means of modifying the chemical composition of water. Between liquids and solids there exists that kind of attractive force commonly called *adhesion*, to which are due the phenomena of capillarity or capillary attraction; and under certain circumstances, this adhesive force is capable of overcoming a feeble chemical force, and thereby of effecting the decomposition of bodies whose constituents are held together by weak affinities. Practically, however, filtration is in most cases to be regarded as a mechanical process, by which physical and not any important chemical changes are effected.

The materials employed for the filtration of water are perforated plates of metal or stone-ware, unsized or bibulous paper, flannel or cloth or other tissues, sponge, porous stone (filtering stone,) charcoal (animal charcoal,) and beds of sand and gravel.

On the present occasion we shall confine our attention chiefly to those which are applicable to the filtration of water on the large scale, namely, beds of sand and gravel; but we shall premise a few observations on the use of animal charcoal as a filtering material.

Of all the permeable substances used for the purpose of filtration, animal charcoal possesses in the highest degree the combined mechanical and chemical influence to which we have already referred. In addition to its power, in common with other filtering media, of removing suspended or mechanical impurities, it also abstracts from the liquor which permeates it, various dissolved bodies, and thus effects a change in the chemical composition of the fluid which traverses it. Thus it removes odorous and coloring matters, bitter principles, vegetable alkaloids, resins, tannin, and even metallic substances, from their solutions. By filtration through it the most stinking ditch water may be deprived of its noxious odor and flavor, and highly colored solutions,

such as wines and other brown saccharine liquids, are rendered colorless by it.

These important properties of animal charcoal have oftentimes led to its recommendation and use as a filtering medium for water; and accordingly it is introduced into many of the common domestic water filters. But its deodorizing and decolorizing power is soon lost, and in order to enable it to re-acquire its former efficacy, it requires to be again burned. Sugar refiners are obliged to renew weekly the animal charcoal which they employ for the decolorization of brown syrups. So that when employed in water filters, animal charcoal requires renewal every week or two.

Of all known permeable substances, the only ones which present all the requisites of filtering media for water on a large scale, are sand and gravel. These are cheap, allow the passage of water through them, and, when they have been previously well washed, communicate no impurity to the waters which traverse them. Their employment must have been suggested to man by the observation of the numerous limpid springs which arise in sandy and gravelly districts.

Their action is chiefly, if not entirely, mechanical. They possess little or none of that power of effecting chemical changes on the liquids filtering through them, which, as we have before remarked, animal charcoal possesses in so pre-eminent a degree. Yet, unless several distinguished writers have grossly deceived themselves, sand is not entirely devoid of this chemical influence.

Wagenmann, for example, found that when vinegar is filtered through pure quartz sand, the first portion of liquid that runs through is deprived of almost all its acid, and the vinegar does not pass through unchanged until the sand has become well charged with acid. The same authority also states that potato-brandy diluted with water and filtered through quartz sand, yields at first pure water, then a mixture of water and alcohol deprived of its fusel-oil, and, lastly, the original mixture unaltered.

Berzelius filtered a saline solution through a long tube filled with sand, and found that it ran out more or less completely deprived of salt.

Matteucci repeated Berzelius's experiment and confirmed his statement. He filled a tube about twenty-six feet long with sand, and filtered a saline solution through it, and he found that the density of the liquid introduced by the upper aperture of the tube was to that of the liquid escaping from the lower end as 1.00 to 0.91. But he observed that this difference of density was not always maintained; for after a certain time the saline solution becomes as dense at its exit from, as its entrance into, the tube; proving that the decomposition of the saline solution takes place in the first action of contact between it and the particles of sand.

But a still more remarkable result, the inverse of the one just stated, was obtained by the last mentioned author with a solution of carbonate of soda. He filled a tube, nearly ten feet long, with sand, and filtered a solution of carbonate of soda through it; and he found that the density of the liquid at its entrance was to that at its exit as 1.000 to 1.005. In this case then the sand had deprived the solution of part of its water, and had thereby increased the gravity of the liquid which filtered through.

Assuming, however, the accuracy of all these reported observations, it cannot be doubted that, in a practical point of view, the efficacy of sand, as a filtering medium, depends on its mechanical, not on its chemical influence.

Domestic water filters are usually made of stone-ware, and usually contain a combination of filtering materials—such, for example, as sponge, sand, and charcoal.

The filter beds used by several of the metropolitan water companies consist of a number of layers of sand and gravel, resting on perforated drains or tunnels. They will be more fully noticed hereafter.

3. *Ebullition*.—Boiling effects the expulsion of air and carbonic acid from water. It decomposes the bi-carbonate

of lime; carbonic acid gas being given out, and chalk or simple carbonate of lime precipitated. The fur which lines the tea-kettle, and the incrustation on the interior of steam-boilers, are chiefly composed of chalk. Lastly, ebullition destroys the vitality of either vegetable or animals found in water.

4. *Distillation*.—When properly conducted, distillation is the most effectual method of effecting the purification of water. But as it is manifestly not applicable to the purposes we have in view, it will not be necessary to enter into details respecting this mode of purifying water.

5. *Clarification, Clearing, or Fining*.—Under this head, we propose to notice certain methods of removing, from muddy water, those floating or suspended impurities which render it turbid or opaque. The methods in question are essentially mechanical processes, and are somewhat similar to the fining or clarifying processes used for wine and beer.

It is well known, that the finings used for beer and white wines are of a gelatinous nature; but for red wines, as well as for some other liquids, white of egg (an albuminous substance) is used.

In some semi-barbarous countries, muddy water is cleared or fined, and hereby rendered fit for drinking, by rubbing the inside of the earthen vessel containing the water with some kind of seeds, and then putting it aside, so as to allow the impurities to deposit, and from these the supernatant clear water is decanted.

In India, the seeds of *Strychnos Potatorum* or *Clearing Nuts*, are used for this purpose. The fruit of this plant is a shining berry, about the size of a cherry, and, when ripe, is black. It contains one seed, which is about the size of a cherry-stone.

“The ripe seeds,” says Dr. Roxburgh, “are dried, and sold in every market to clear muddy water. The natives never drink clear well water if they can get pond or river water, which is always more or less impure, according to circum-

stances. One of the seeds is well rubbed for a minute or two round the inside of the vessel containing the water, generally an unglazed earthen one, which is then left to settle, In a very short time the impurities fall to the bottom, leaving the water clear, and so far as I have been able to learn, perfectly wholesome. These seeds are constantly carried about by the more provident part of our officers and soldiers in time of war, to enable them to purify their water. They are easier to be obtained than alum."

Dr. O'Shaughnessy suggests that the clearing action depends on astringency in the fruit. But even if there were an astringent principle present, it would not account for the effect. We believe the efficacy depends on the presence of albumen and casein in the seed, which act as fining agents, like those employed for wine and beer. If the seeds be sliced and digested in water, a thick, mucilaginous ropy liquid is obtained, which, when boiled, yields a coagulum. If this be removed, a further coagulum is obtained, by the addition of acetic acid. These reactions show the presence of albumen and casein.

If this opinion be well founded, many other seeds ought also to have a similar influence; and this really appears to be the case. Thus we are told that, in order to clarify the muddy waters of the Nile, the natives of Egypt rub the inside of earthen jars, in which the water is kept, with almonds prepared in a particular manner. The water is then strongly agitated, and afterwards covered, and allowed to remain at rest for four or five hours, at the end of which time the impurities have subsided, and the supernatant clarified water is decanted.

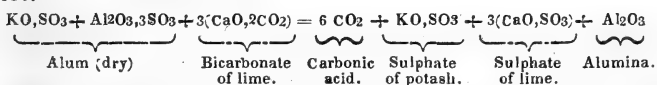
Niebhur says bitter almonds are used; but Dr. Arcet states that either bitter or sweet almonds may be employed. They are peeled, and made into cakes as large as eggs.

At Sennaar and Dongola, in Nubia, beans, haricots, and even castor seeds are also used for clearing the water of

the Nile. We have no doubt that the efficacy of all these seeds in clearing water depends on the albumen and casein which they contain.

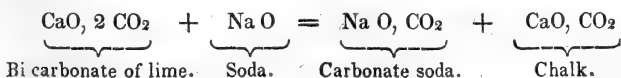
6. *The addition of Chemical Agents.*—This head includes several proposed methods of purifying water, which consist in the addition of certain chemical agents to this liquid, by which its composition is altered.

a. *Addition of Alum.*—In England as well as in France a popular method of clearing muddy water is to add a few grains of powdered alum to it (two or three grains are usually sufficient for a quart of water.) This process our neighbors call the *alunage de l'eau*; and Arago states that when practised on the Seine water it causes the mud to agglomerate in long thick striæ which are very quickly deposited. The theory of the process appears to be this: the alum decomposes the bi-carbonate of lime, and gives rise to the formation of sulphate of lime, which, with sulphate of potash, remains in solution, while carbonic acid is evolved, and hydrate of alumina being precipitated in a flocculent form, carries with it various mechanical impurities.

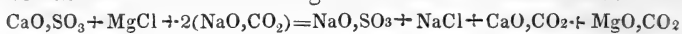


This process then is a kind of mechanico-chemical one. It clears the water, but at the same time alters its chemical composition, and by converting bi-carbonate into sulphate of lime augments the hardness of the water.

b. *Addition of Caustic or Carbonated Alkalies.*—Caustic alkalies added to water holding in solution bicarbonate of lime, saturates the excess of carbonic acid, throws down carbonate of lime (chalk,) and leaves an alkaline carbonate in solution. If soda be the alkali used the result will be as follows:

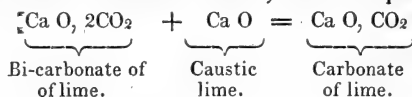


If an alkaline carbonate be employed, all the earthy salts (calcareous and magnesian sulphates, chlorides, and bi-carbonates,) carbonates of the earths, are precipitated, while alkaline sulphates, chlorides, and bicarbonates which do not communicate hardness to water, are left in solution. If carbonate of soda be employed, its reaction on sulphate of lime and chloride of magnesium will be as follows :



Sulphate of lime,
of lime, magnesium.
Chloride of soda.
of soda.
Sulphate of soda.
of sodium.
Chloride of lime.
of lime.
Carbonate of soda.
of soda.
Carbonate of lime.
of lime.

c. Addition of Lime.—A few years ago Professor Clark of Aberdeen took out a patent for the purification of water. His process consists in the addition of caustic lime to water; by which the bi-carbonate of lime held in solution is decomposed: the caustic lime saturates the excess of carbonic acid, and forms carbonate of lime, which is precipitated.



We believe Clark's process to be virtually impracticable on the large scale, while its efficacy is but slight..

It must be remembered that this process affects the bi-carbonate of lime, not the more troublesome earthy salts, such as the sulphates and chlorides, on which the hardness of spring waters mainly depends. The difficulty of mixing lime and water in definite proportions, on the large scale, must be obvious to every one. If too much be employed the companies would furnish their customers with lime-water! If too little, the bi-carbonate of lime would not be completely destroyed, and the process would be a failure. Altogether the difficulties of carrying out the process are such that we believe it to be impracticable for water companies.

But the advantages of the process have been greatly exaggerated. The calculation of the patentee that, by the adoption of his process, the metropolis would annually save

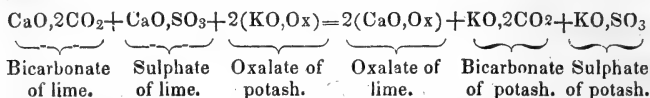
£63,000 (being ten per cent. on the estimated value of the soap and soda consumed) is, we believe, all moonshine. The washing of clothes, as practised by our metropolitan nymphs, is usually affected by hot, not by cold water; and as by boiling, the same softening effect is produced on water which Professor Clark proposes to obtain by his patent process, the London washerwomen already adopt as good a process without the payment of anything for the use of a patent.

Lastly, the complaints made respecting the quality of the water supplied by the metropolitan companies apply to the organic matter chiefly, rather than to the earthy salts. For though Thames water contains on an average about fourteen per cent. of calcareous salts, yet the greater part of this is bi-carbonate of lime, which by boiling is decomposed as explained above. Now, as in washing, brewing, tea-making, &c., the water is usually boiled before it is used, the inconvenience produced by the bi-carbonate is but little felt; and the real complaints relate to the suspended or mechanical impurities, and to the dissolved organic matter.

d. Addition of Oxalate of Potash.—Mr. Horsley, a respectable Pharmaceutical Chemist of Ryde, Isle of Wight, has taken out a patent for a new method of preventing incrustations in boilers, and also for purifying, filtering and otherwise rendering water fitter for drinkable and other purposes. When sea water is employed for generating steam, he purifies it by employing oxalate of potash and ammonio-phosphate of soda; and the proportions which he employs for the water of the British Channel are about two drachms of oxalate of potash to about two ounces of the ammonio-phosphate of soda for every gallon. When his object is to purify and soften hard water he employs such substances as are capable of decomposing the calcareous salts, such as calcined or caustic baryta, or baryta water, phosphate of soda, silicate of potash, oxalic acid or the oxalates, and caustic strontia, or strontia water; but he

gives the preference to oxalate of potassa. He first ascertains the degree of hardness of water, and then adds the requisite quantity of oxalate of potassa, by which an oxalate of lime is precipitated, and there remains in solution, instead of the lime displaced, a carbonate, sulphate of potash or chloride of potassium, as the case may be, and the water is purified and fit for use.

The following equation explains the reaction of oxalate potash (we assume the salt to be neutral) on bi-carbonate of lime :



Mr. Horsley's patent process does that which Professor Clark's fails to do : it decomposes all the earthy salts on which the hardness of water usually and mainly depends. But it is open to still greater objections than those that have been raised to the other method. Besides being like Clark's process virtually impracticable, it would prove very expensive, and as regards the metropolitan river waters it is quite unnecessary. Moreover the idea of "physicking" or "doctoring" the water by the addition to it of a poisonous agent, would, if even no other objection existed to this scheme, be quite fatal to it. For though in the hands of competent persons like Mr. Horsley, no possible injury could arise from its use, yet the public would always have some suspicion of water thus treated ; and as a certain English engineer once observed to Arago, "*Water, like Cæsar's wife, should be above suspicion.*"—*Pharmaceutical Journal*, April 1, 1850.

ART. LX.—ON PAPAVERINE.

BY G. MERCK.

The name papaverine has been assigned by the author to the new and well-characterized alkaloid discovered by him some short time ago in opium. According to the following investigation, its composition is represented by $C^{40} H^{21} NO^8$.

It is obtained by precipitating the aqueous extract of opium with soda, exhausting the precipitate with alcohol, and evaporating to dryness the brown tincture obtained. The residue is treated with dilute acid, the liquid filtered and precipitated by ammonia, when a resinous matter is obtained which contains the papaverine.

To procure it in a pure state, the resinous matter is dissolved in dilute muriatic acid, and mixed with acetate of potash. Another resinous precipitate is obtained, which after being washed with water is treated with boiling ether. From this solution the papaverine crystallizes on cooling.

This alkaloid may be prepared in a still more simple manner from the first dry resin. When mixed with its weight of alcohol, a smeary syrupy mass is formed, which on standing for several days at a temperature of $88^{\circ}F$. congeals to a paste of crystals. This is strongly pressed, and purified by recrystallization from alcohol and digestion with animal charcoal. The papaverine is treated with hydrochloric acid, to remove some narcotine which it still contains, and set aside to crystallize, when the sparingly-soluble readily-crystallizable hydrochlorate of papaverine separates, and the whole of the narcotine can now be removed by washing with cold water.

Papaverine separates from alcohol in a confused tissue of white acicular crystals, which are sparingly soluble in cold alcohol and ether, dissolve more abundantly on the appli-

cation of heat, and separate again on the cooling of the solutions. It is insoluble in water. The solutions of papaverine turn slightly-reddened litmus-paper blue. When moistened with concentrated sulphuric acid, it acquires a dark blue color, by which it is easily recognized.

The papaverine used for analysis was prepared from the pure muriate, which had crystallized from the aqueous solution, by dissolving it in hot water, precipitating with ammonia, and crystallizing the precipitate from alcohol. The analysis furnished—

Carbon	-	-	70.68	70.47	70.62
Hydrogen	-	-	6.65	6.32	6.65
Nitrogen	-	-			4.75

These numbers, with the assistance of those obtained in the analysis of the platinum double salt, lead to the following formula for papaverine:—

				Mean of Experiments.		
Carbon	-	-	-	70.59	40 = 240	70.79
Hydrogen	-	-	-	6.50	21 21	6.20
Nitrogen	-	-	-	4.75	1 14	4.13
Oxygen	-	-	-		8 64	18.88

Chem. Gaz. March 15, 1850.

ART. LXI.—ON THE RESIN OF THE NORWAY SPRUCE FIR. (*ABIES EXCELSA*.)

BY MR. DANIEL HANBURY, JUN.

In the *Materia Medica* of the London Pharmacopœia, two forms of the resin of the Norway Spruce Fir (*Abies excelsa*) are enumerated: one *Abietis resina*, called Common Thus or Frankincense; the other, *Pix Abietina* or Burgundy pitch. The latter is stated to be the resin in a prepared state (*Resina præparata*), the preparation essentially consisting in the removal of the impurities by straining.

The first of these substances, viz., *Abietis resina*, is rare in English commerce, and it was not until during a recent visit to Switzerland, that I had an opportunity of obtaining an authentic specimen. In many parts of that country this species of *Abies* is very abundant, forming extensive and beautiful tracts of forest. The resin exudes spontaneously from fissures in the bark of the tree, and especially from those places where branches have been broken off. When it first issues, it is sometimes quite transparent and liquid, but is more commonly found opaque, and of a pale yellow color and soft consistence. By exposure to the air, it hardens and becomes of a browner tint. Some of the hardened tears are internally white and opaque, like drop ammonia-cum, the broken surface acquiring a pink hue by exposure to the air. The odor is peculiar, terebinthinate, cheesy, and rather aromatic; the taste slightly bitter.

The article now sold as *Abietis resina*, is believed to be imported chiefly from America, and in odor and color much resembles common American turpentine hardened by age. It usually occurs in large agglutinated masses, whose surfaces when long exposed become transparent, brittle, and of a deep yellow color. Internally, they are soft and opaque, pale yellow marbled with whitish patches. The odor is that of common American turpentine, though not so powerful. Some of this resin appears to have exuded spontaneously, and contains such impurities as small chips of wood, sticks, leaves, &c. The leaves are evidently not those of the Norway spruce fir.

When genuine *Abietis resina* is melted in hot water, strained and cooled, we obtain Burgundy pitch, as a very pale, yellowish brown substance, almost entirely soluble in cold alcohol, easily softening in the hand, and having a peculiar, agreeable, aromatic odor. Burgundy pitch, apparently genuine, is imported from Hamburg in tubs called *stands*, each containing about one hundred pounds, but it is usually in so impure a state as to require straining, some-

times a rather difficult process involving considerable loss. It is moist, of a greyish buff color speedily becoming dark on the surface by exposure to the air; when strained it acquires a browner hue, and is very adhesive. It was formerly called Rhine pitch, to distinguish it from another imported variety now seldom seen, which was designated Baltic pitch.

Baltic pitch is a brittle resin, externally transparent, and of a bright yellowish brown color, internally pale buff, and very opaque. Its odor is slight but agreeable, though wanting the peculiarity of that of genuine Burgundy pitch. I know not its botanical origin.

Artificial Burgundy pitch, apparently intended as an imitation of the sort last described (since it strikingly differs from the Hamburg or genuine sort) is manufactured in London and elsewhere, and is sold in bladders, as a clear brittle resin, very moist, of a fine orange yellow color, and having but little odor and taste. It does not completely dissolve in cold alcohol.

Other varieties of spurious Burgundy pitch are employed on the continent, but as they do not occur in English commerce, it seems unnecessary to describe them.—*Pharmaceutical Journal*, March, 1850. *By the Editor.*

ART. LXII.—ON AMALGAMS FOR STOPPING TEETH.

BY ARNOLD ROGERS, ESQ.

I have much pleasure in communicating, through the Pharmaceutical Society, a few remarks on amalgams, as well as the formula for the one I have used for some years; and although occasionally some specimens have come under my observation, which seemed to possess qualities superior to the general character of amalgams, yet, on the

whole, I have been satisfied with my own compound. Not but that I think it may be improved upon; and, when leisure time will allow me, I shall endeavor to profit by the hints and communications of my professional brethren.

It should be thoroughly understood, that whenever gold foil can be used, it ought to be; and, in the majority of cases it can be. In my opinion, amalgams should be used only when the cavity of the tooth is so large as to endanger a fracture of the walls, by the pressure required to weld the gold foil, or when the tooth is too tender to allow pressure upon it from any cause. I may be permitted to observe, however, that frequently a tooth will be exquisitely sensitive when amalgam is applied; yet, at the expiration of twelve months or more, the amalgam will appear to have had the effect of removing all tenderness, and a perfect gold foil plug can be introduced without the slightest pain to the formerly tender cavity.

For some years in our early knowledge of amalgams, nothing but silver coin was amalgamated with mercury. This, from discoloring the teeth so much, gave rise to improvements in that respect; and, although it formed a very hard and useful compound, its tendency to oxidation was a great objection to its use, especially in the side-front of the mouth. Other amalgams were substituted, and among them pure silver amalgam, which does not discolor when both silver and mercury are *perfectly pure* (as in all amalgams the metals must be, to ensure perfect results;) but it is too friable for long endurance, and is not so much used as formerly. Amalgams of platinum, and of gold and platinum, have been much used, and with pretty good results, though, from some cause or other, I have found them variable in the preparation.

A new compound has lately been introduced to us by Mr. Evans, of Paris, in the "Dental News Letter," for January, 1850. He describes his compound, which is an amalgam of tin and cadmium; and although it has not

succeeded to the extent of his anticipation, yet he merits our thanks for his undisguised and honorable communications on the subject—perhaps as much for his retraction *under his sanction*, as for its introduction. It certainly promised, in the outset, to be a great boon, principally from its great facility of application and endurance of color. Its title to this latter property, however, is questionable in many cases, and, in some patients of delicate health, it is subject to the same objection as any other of the amalgams. A more perfect compound is, however now being tested, introduced by Mr. Robertson, of Birmingham; and no doubt that gentleman will not allow the liberality of our American brother to surpass his; but Time, the great test of all things, is necessary for its rejection or adoption.

All the compounds which contain copper quickly become discolored; the amalgam is more compact, but its black color in front is most objectionable. Even gold having a trace of copper in the compound, soon becomes black.

I was favored with a communication, a few months ago, by a gentleman who has for some time employed an amalgam of palladium, and it certainly carried evidence of a beautiful preparation, as compact and of finer texture than the amalgam I use; but I *fancied* it was slightly more discolored than mine.

I will now give the instructions necessary for preparing the amalgam I have so long used. The convenience of the parties making it may, however, alter this mode, without injury to its efficacy: but as most dentists have a solution of nitrate of silver at hand, resulting from their work-room, they may employ it without any loss.

Chloride of silver is prepared by precipitation from the nitrate by adding common salt. A pasty deposit immediately takes place; and, when all the silver is thrown down (which is known by the addition of a few drops of hydrochloric acid not rendering the fluid turbid,) it should be washed and drained, so as to leave a pasty mass. Into this

a piece of zinc is immersed. In the course of two or three days (according to the quantity submitted,) all the silver will be reduced to the metallic state; you then remove the zinc. To ascertain the weight of silver you have to amalgamate, it is necessary to weigh the piece of zinc before submitting it to the paste, and the loss of weight which the zinc sustains will be equivalent to the weight of metallic silver produced. To this may be added six or eight times its weight of pure mercury, which must be triturated in a mortar, with warm water for several hours, or so long as the mass continues in the least to discolor the water. The operator will discover the pasty adhesiveness which the amalgam will require as he proceeds; and for this part of the process it is better to have an excess of mercury, which can be squeezed out, and should leave, at the conclusion of the operation, an amalgam composed of one part of silver and four parts of mercury. This amalgam of silver is to be united with an amalgam of gold.

The amalgam of gold may be prepared by putting ribbons of pure gold (similar in thickness to that which gold beaters commence beating with) into heated, or nearly boiling, *pure* mercury, and in the proportion of four mercury to one gold. This may be poured into a mortar containing water, and washed, as the silver amalgam, so long as the least discoloration appears in the water. This should be freed of its superfluous mercury, and the mass should consist of gold one part, mercury three parts.

It may be well to observe, that these amalgams retain a little water in the interstices of the mass; and to prevent any displacement from the spoon in after use, it is well to dry them, by gently rubbing them with a soft towel, or upon bibulous paper.

The amalgams being now perfectly pure, it may be well to keep in separate boxes the little pellets necessary for combination of the compounds; and the proportions are two parts by weight of the gold amalgam to one of silver. I have found it to become a more compact mass by the

first crystallization, although, should there be any residue, it may be heated, and rubbed up again, with a fresh supply for a future operation. The two pellets had better be triturated thoroughly in a mortar before the compound is submitted to the flame of a spirit lamp; and I have observed that, for the better incorporation, it is necessary to submit it to heating and trituration in the usual way, three or four times. The cavity of the tooth being quite prepared for the reception of the amalgam, all the mercury that can be pressed out between the thumb and fingers should be so separated and the compound immediately packed in the cavity. A little nicety is requisite in keeping, by gentle trituration, between the thumb and finger, the compound in as hard, and at the same time as pasty a state as possible, so as to prevent it becoming friable or crumbling during its introduction.—*Pharmaceutical Journal, March, 1850.*

ART.—LXIII.—NOTICE OF THE COPALCHI BARK.

A new and valuable Bitter, analogous to the Cascarella.

BY JAMES STARK, M. D.

Fellow of the Royal College of Physicians, Edinburgh.

In the course of some inquiries into the remedies used in Chili and Peru, I received from one of my correspondents in Chili a bitter bark under the name of *Natri*, which was stated to be much employed by the medical practitioners and natives of Chili in the treatment of intermittent and other fevers, and held in higher repute than even Peruvian bark itself. The bark and leaves sent enabled me to ascertain that the *Natri* was the produce of a species of *Croton*, but from the want of the flowers and fruit, the particular species could not be ascertained.

In the course of a correspondence with my friend John Elliott Howard, Esq., Tottenham, he mentioned to me that a quantity of bark had been received by the Messrs. Gibbs, of London, from San Blas, which appeared to be analogous to, if not identified with, the *Natri*. A small quantity of the same bark had also been brought over from Santa Cruz, by a gentleman, who stated that it was there known under the name of *Chiquique*, and was *always* given to the Indians in fever cases, and was considered by the medical practitioners there as superior, in certain cases, to Cinchona bark itself.

Mr. Howard at once recognised this bark as the Copalchi bark of Goebel, a valuable Mexican bitter, described by him as the product of the *Croton suberosum*; and through the liberality of the Messrs. Gibbs, that gentleman sent me first a few pounds to make trial of it in practice, and then the whole quantity imported into this country.

Though it has not been in my power to lay my hands on Goebel's description, I have satisfied myself as to this bark being that known in Europe since 1825, and described under the names of *Copalchi bark* and *Quina blanca*,—the product of one tree variously termed *Croton suberosum* by Humboldt, Bonpland, Kunth, &c.; *Croton pseudo-china* by Schlechtendal and Nees von Esenbeck; and *Croton Cascarilla* by Professor Don.

The description of the bark given in the *Dictionnaire Universelle de Matière Medicale*, accurately corresponds with the specimens in my possession, as does also that given in the *Dict. des Drogues Simples et Composées*. In these articles it is described as a new and valuable bitter used in Mexico, similar in properties to Cascarilla, and believed to be the produce of the *Croton suberosum* of Humboldt.

It is to Schiede and to Nees von Esenbeck, however, that we are chiefly indebted for ascertaining the exact species of plant which yields the Copalchi bark, and showing by their descriptions and figures that the tree which they

describe as yielding it is that formerly called by Humboldt the *Croton Suberosum*. Schiede, as well as Nees von Esenbeck, found this Copalchi (which is the Indian name) sold in the Apothecaries' and Druggists' shops at Jalapa, and over the province of Mexico, under the name of *Quina blanca* and considered by them there as the finest and best sort of Cascarilla. Indeed, Schiede was so convinced that he had discovered the true source of the best cascarilla, that from the examination of the tree which produces this Quina blanca, he asserted that the best Cascarilla was the produce of the *Croton Pseudo-china* of Schlechtendal—now called by Professor Don the *Croton Cascarilla*.

Nees von Esenbeck only went the length of considering the Copalchi as closely resembling the Cascarilla, and gave, in the supplement to his splendid work, the *Plantæ Medicinales*, most beautiful colored figures of the copalké-croton in all its states, flowers, fruit, leaves, and bark, rendering it perfectly impossible ever hereafter to mistake the bark or plant which he describes. He also terms the tree the *Croton Pseudo-china*.

Copalchi bark was subjected to a minute analysis by Mercadieu, in 1826, who found it to contain no crystallizable alkaloid, but the following principles:—1. An astringent matter of a deep brown color. 2. An excessively bitter principle (containing also an astringent principle,) soluble in water. It is in this bitter principle that the febrifuge properties reside which the physicians at Vera Cruz have recognised it to possess. 3. A green fatty substance. 4. A clear brown resin, insipid and inodorous. 5. A brown animalized coloring matter, insoluble in ether and absolute alcohol, but soluble in dilute alcohol and in water. 6. Starch. 7. Woody fibre. 8. Phosphate and oxalate of lime. The burnt ashes yielded hydrochlorate and sulphate of potass, oxides of iron and of manganese, carbonate and phosphate of lime, with traces of magnesia and silica.

Brandes, who analyzed this bark the year following,

could not detect any crystallizable alkaloid, but recognised the bitter principle on which its active properties depended—a resin, concrete fatty oil, &c.

This bark is now undergoing a minute analysis by Dr. Douglas Maclagan and Dr. Anderson. Meanwhile, my friend, Mr. Howard, has made some trials to prepare the bitter principle in a pure state. The bark was exhausted by almost absolute alcohol; this tincture evaporated to dryness; the bitter principle removed from this extract by cold water, which left the residuum of waxy matter, and, on evaporating this aqueous solution to dryness, the bitter principle was obtained in dark brown, almost black, lustrous, but non-crystalline scales, of an intensely bitter taste. The bitter principle thus procured possesses the strange property of being deliquescent, requiring it to be kept in closely stoppered phials.

Copalchi bark yields an agreeable aromatic bitter to water, but especially to proof spirit. The tincture and spirituous extract, indeed, are agreeably aromatic, and on first tasting, leave on the tongue and palate a sweetish taste.

Since I have received the first samples of Copalchi bark, I have made trial of it in a few cases, which seemed tolerably well fitted for testing its properties,—if it possessed any.

The first case was one of atony of the stomach and bowels, with weak and imperfect digestion, and irregular action of the bowels, at one time costiveness, at another slight diarrhœa, existing. In this case, the usual bitters, as gentian, quassia, and columbo, disagreed, exciting nausea, &c., while Peruvian bark and quinine increased the headache, and induced a feverish state of the system. The case, however, wonderfully improved under the use of the simple infusion of the Copalchi of the strength of half an ounce of bark to the pint of boiling water given in table-spoonful doses three times daily.

In the second case in which trial was made of Copalchi bark, the patient suffered from irregularity of the bowels, but with this peculiarity (several instances of which came under my notice during the past winter during the prevalence of cholera,) that twice daily, viz., at three o'clock afternoon and three o'clock morning, more or less violent spasmodic cramp in the bowels came on, preceded by shiverings and coldness, and terminating by a sweating stage Quinine, in $1\frac{1}{2}$ grain doses, twice daily, had been given for two days, with the effect of completely checking these intermittent paroxysms, when it was obliged to be stopped in consequence of its inducing violent headaches, flushing of face, and feverishness. The paroxysms immediately returned as before, but, on substituting infusion of Copalchi, giving a wine-glassful at two o'clock afternoon, and the same quantity at bed time, the paroxysms were arrested, and have not since returned.

Like relief followed in another but milder case of the same nature. In this case the cure was trusted entirely to the Copalchi, no other medicine being given, in order to see whether it really possessed any anti-periodic powers. It is, therefore, scarcely possible to doubt that it possesses some anti-periodic virtue, so that we can easily believe what is stated of its powers by the Mexican and Peruvian Physicians in arresting the paroxysms of intermittent fevers.

It has been used in several other cases, but without the results being so striking as to render its superiority to other bitters unquestioned. I am at present giving it in a case of epilepsy, in which all other bitters had disagreed, excepting that much neglected but valuable bitter, the trefoil (*Menyanthes trifoliata*.) and the case, so far as it has gone, has succeeded satisfactorily under the use of the Copalchi bark. Dr. Bennett informs me that he is administering it to an epileptic case in the Royal Infirmary, apparently with marked benefit.

When I received the first few pounds of Copalchi bark, I sent some to the Royal Infirmary, and to the two principal Dispensaries, in order to let this bitter get a fair trial. I have not yet received reports from these institutions, but learn that in every case that this bitter has been administered, it has given satisfaction, proving an agreeable light bitter. Being now in possession of the whole importation of this bark, through the liberality of Messrs. Gibbs, and being anxious that its powers should be fairly and thoroughly tested by the medical men of Edinburgh, parcels of it have been sent to the Royal Infirmary, to the New Town and Royal Dispensaries, and to the Leith Dispensary; and the remainder lies with the Messrs. Duncan and Co., Druggists, at whose shops in Edinburgh and Leith, small quantities of the bark may be obtained gratuitously, by those who wish to prepare it for themselves. The Messrs. Duncan and Co., will also keep the infusion, decoction, tincture, and spiritous extract ready for prescription, charging merely for the trouble and cost of materials used in the preparation, as the bark itself is *not to be sold* at present. Should the bark be found to prove a valuable addition to our stock of bitters, it could soon be procured from Mexico and Peru in any desired quantity; meanwhile, I would invite the profession in Edinburgh to make trial of it, and shall feel much obliged if they will make the results of their trials known to me.

It appears to me, that one of the great wants in the medical practice of the present day is, a good light bitter of some real therapeutic powers. Most of the bitters in common use are harsh, disagreeable, and heavy, often exciting nausea, aggravating rather than allaying the irritability of a stomach already too irritable. To avoid these it has become of late too much the practice to employ quinine, bebeerine, strychnine, or other concentrated bitters or alkaloids, which in many cases do more harm than good. Satis-

fied I am of this, that in dyspeptic cases especially, by employing the alkaloids or bitter principle, separated from the aromatic, resinous, or other principles with which they are usually associated, we destroy to a great extent the therapeutic powers of the drug, and fail to derive those benefits which we should receive from making use of a spirituous extract, a tincture, or even the simple infusion or decoction of the drug. The warm aromatic principles, associated with the powerful bitter in the Copalchi, seem to me to supply the want of a light bitter, which most practitioners must have experienced ; and it is to be hoped, that it will succeed in the hands of others as much as it has as yet done in mine.

It may be remarked, that the infusion and decoction of Copalchi are best made of the strength of half an ounce of bark to one pint of water. The tincture, with one ounce of bark to one pint of proof spirit. The dose of the infusion and decoction is a table-spoonful or small wine-glassful twice or thrice daily. Of the tincture, one or two tea-spoonsful, or of the extract from one to two grains, twice or thrice daily.

As Copalchi bark yields freely much coloring matter, might it not be employed with advantage in dying ? One, at least, of the crotons yields a valuable dye ; and even the cascarilla itself is used in France as a dyestuff, yielding a rich black color, which is easily fixed on stuffs little fitted for receiving fine dyes.—*Pharmaceutical Journal*, April 1, 1850.

VARIETIES.

On the therapeutic action of Digitalin. By DR. STROHL. The action of digitalin is the same as that of digitalis, of which it is consequently the true active principle. There is, therefore, a great advantage in using this substance because it constitutes an identical and invariable preparation. It is of course important to be aware of the doses of this principle, as it is so much more active than the digitalis itself. The following are the conclusions arrived at by M. Strohl relative to the therapeutic action of Digitalis and its administration :—

1st. Digitalin has no particular action that distinguishes it from the drug, its indications are therefore the same as those for digitalis. 2d. Its sedative action on the heart may fail. 3d. It acts easily on the stomach and brain. 4th. In certain cases it diminishes the dyspnea without lowering the number of palpitations of the heart. 5th. It has the great advantage over digitalis of being always identical in composition and consequently being more sure in its effects. 6th. The solution is preferable to the solid form. 7th. Its administration is commenced with one milligramme (1-65th of a grain) per day, and each dose is augmented generally half a milligramme daily until it increases to five or six milligrammes 1-14th to 1-11th of a grain.)—*Jour. de Pharm., from Gazette Médicale de Strasbourg, 1849.*

On some Tests for Quinine. By DR. VOGEL, Jr.—A very characteristic test for sulphate of quinine has already been pointed out by Brandes. It consists in mixing a solution of sulphate of quinine with chlorine water, and then adding caustic ammonia, when the liquid strikes an emerald green color. Starting from this experiment, I have suc-

ceeded, by the use of some other reagents, in producing some highly remarkable changes of color in a solution of the sulphate of quinine.

If an excess of a concentrated solution of the ferrocyanide of potassium, instead of ammonia, is added to the solution mixed with chlorine water, a dark red color is instantly produced, which persists some hours, but then passes into green, especially when exposed to the action of light. This reaction is highly characteristic of quinine. If caustic potash is used instead of the ammonia, the solution acquires a sulphur-yellow color. A solution of chloride of lime mixed with muriatic acid may be advantageously substituted for the chlorine water, in which case a green powder falls on the addition of ammonia. As the above reactions do not take place with cinchonine, they may be considered as distinguishing characters of the two alkaloids.—*Chem. Gaz. from Leibig's Annalen, Feb. 1850.*

Chinese "Rice Paper," or "Bok-Shung."—Thanks to our most obliging friend, Capt. Wm. Lohring, R. N., who has put us in communication with several intelligent gentlemen now resident in China, we are in a fair way of obtaining correct intelligence relative to many interesting scientific objects, and of having our doubts solved on some important botanical matters. J. H. Layton, Esq., H. B. Majesty's Consul at Amoy, China, has most kindly sent us, not only excellent specimens of the *pith*, from which the so called *Rice-paper* is formed, but a model of the knife used in cutting it, and, what is even of more value, the following information:—

The substance, commonly called *Rice-paper* by the Chinese, is made from the pith of a plant or tree, which grows principally in the swampy grounds in the province of *Sam-swi*, in the northern part of the island of Formosa, where it is said to form large forests. The bark and rind are previous to exportation, stripped from the pith, which is then called *Bok-shung*.

The iron knife commonly used for cutting this pith weighs about $2\frac{1}{2}$ pounds, and is of the roughest and coarsest workmanship,* and perhaps not one blade in twenty is sufficiently well tempered to be advantageously used. In cutting, the knife is kept quite steady, the cylindrical pith being moved round and round against the edge of the knife, which is just inserted into the substance, and thus a leaf or sheet is formed, resembling the most delicate paper, but rather thick in substance. When brought quickly from the workman's hand's, the paper is in a damp state. It may have been rendered so, in order to facilitate the smoothing and pressing.

At Chang-chew, the large city of which Amoy is the sea-port, there is only one man who can cut this paper. This person ran away from his master in Formosa, and refuses to teach his trade except for a premium of sixty dollars.

It is said that there is a neat method of joining this paper when broken, and that it is chiefly made from the smaller pieces of the *Bok-shung*, and that the larger pieces are used in medicine in the same way as Epsom salts.

It is in vain to conjecture, from the pith alone, to what plant or tree this exquisitely beautiful substance belongs. The vulgar opinion still generally prevails, that, because it bears the name of *Rice-paper*, it is manufactured from rice; but the slightest inspection with a microscope exhibits the exquisitely-delicate medullary portion of a dicotyledonous stem. Again, from an affinity with the well known *Shola*† of the East Indies, many have supposed, and even Chinese travellers have declared, that *Rice-paper* is made from this, the *Æschynomene paludosa*. But a comparison of the

*The model (of wood) sent would indicate this. It has a very broad, straight blade, and a short, straight handle, and is more like a small bill-hook, (wanting the hook) than a knife.

†Of which floats and buoys for fishermen, and the very light hats of Singapore, are made.

two will clearly show the difference. Both are light and spongy; but the *Shola* is far less delicate than the *Bok-shung*, and is always exported "peeled," the external coatings being removed; whereas the *Shola* is always sent covered with its thin brown bark. A chinese drawing of what is said to be the *Rice-paper plant* is in possession of Dr. Lindley; but neither flower nor fruit is represented. Some have conjectured this to be a Malvaceous plant, others Araliaceous. We have seen in the branches of the common fig, *Ficus Carica*, a copious medulla, very much resembling, in its texture and pure whiteness, that of the *Bok-shung*.

We have the gratification of knowing that our Consul at Amoy will use his best endeavors to procure flowering specimens of the plant itself.—*Pharm. Journ*, May 1, 1850, from *Hooker's Journal of Botany*.

Iridescent Paper. By A. WAGNER.—Eight parts of gall nuts, five parts of sulphate of iron (as free from oxide as possible,) one part of sal ammoniac, one part of sulphate of indigo (blue pot,) and one-eighth part of gum arabic, are to be boiled with water, and preserved in a well closed vessel. If paper washed with this decoction be exposed to the influence of ammoniacal gas, it becomes covered with colors like those of blue steel. Some tints are, however, easily rubbed off. The addition of sulphate of indigo in sal ammoniac, serves only to protect the protoxide of iron contained in the ink from a higher degree of oxidation.—*Ibid.*, from *Pharm. Central Blatt.*, für 1850, P. 156.

On the Purification of Honey. By ANDRÉ V. HIRSCHBERG.—In the *Archiv. d. Pharmacie* xxix. p. 308, the following method of purifying honey is recommended by André:—Twenty-five pounds of honey are to be diluted with half that quantity of water and boiled, with a pulp obtained by stirring three sheets of white blotting paper

with water, over a slow fire, till the pulp is resolved into fine fibres. When cold the whole is placed on a woollen previously moistened filtering-bag, through which the honey soon runs off as clear as wine. The residual paper pulp is then washed, and the dark wine-yellow liquid thus obtained evaporated in the vapor bath. The thus obtained honey answers, according to the observations of Hirschberg, all purposes for which a faultless, purified honey is required.—*Pharm. Journ.*, May 1, 1850.

Unguentum Potassii Iodidi. By A. W. BRIEGER.—From a number of experiments made by Brieger, with regard to the preservation of this ointment, he concludes that 1. Both carbonated and calcined magnesia not only do not prevent this ointment from becoming yellow, but rather promote the decomposition of the iodide of potassium; 2. Carbonate of potash is better adapted for this purpose; but 3. A solution of caustic potash is more effective, a few drops being sufficient to preserve from four to eight ounces of ointment for many months without becoming yellow, or to restore the white color to such as had already become yellow.—*Ibid.*, from *Jahrbuch. für prakt. Pharm.*

New Gunpowder.—M. Augendre, assayer at the Mint of Constantinople, has succeeded in making gunpowder, which is said to be much more powerful than common gunpowder, of a mixture of prussiate of potash and chlorate of potash with sugar. The following are the proportions which have been found to answer best :—

Crystallised prussiate of potash, dried	1 part
White sugar	1 part
Chlorate of potash	2 parts

These ingredients are separately reduced to a fine powder, and then intimately mixed by the hand. In operating on any quantity, the mixture is moistened with a little water and beaten in a mortar, after which it may be granu-

lated by passing it through a sieve, or it may be used in fine powder.

The Academy of Sciences at Paris, to whom Augendre addressed a communication with reference to this explosive compound, referred the subject to a commission consisting of MM. Poibert and Morin, who reported thereon to the following effect :—

The advantages of this gunpowder are :

1. That it is formed of substances which have a fixed and determinate composition, which enables us to depend upon obtaining a product uniform in strength.
2. That these substances are unalterable by the action of either dry or damp air, so that they may be kept for an indefinite period, which is not the case with the charcoal employed in the manufacture of ordinary gunpowder.
3. That the manufacture requires less time, and that larger quantities of the ingredients may be stored away, and be combined as occasion may require, thus rendering large powder magazines unnecessary.
4. The dynamic effect is much greater than that of ordinary gunpowder.
5. That the product in fine powder being equally as effective as that in the state of grain, enables us to obtain the various substances of which it is composed in the state of an impalpable powder by means of ventilation, and mixing them in the dry state in a leathern barrel, turning on its own axis.
6. That the prussiate of potash is not poisonous, but simply a saline purgative salt.

On the other hand, the disadvantages are :—

1. That the chlorate of potash contained in this powder causes the oxidation of steel fire-arms, and thus confines the employment of this powder to artillery.
2. That it is more readily inflamed than ordinary gunpowder, although much less so than all the gunpowders which have hitherto been made containing chlorate of potash.—*Pharm. Joarn.*, May 1, 1850.

Editorial Department.

THE AMERICAN JOURNAL OF PHARMACY.—Coincident with the issue of this number of the Journal, we have to announce the resignation of Dr. Joseph Carson, of his Editorial connection with it. It is now about fourteen years, since Dr. Carson assumed its Editorial supervision, and during this long period he has guided its helm with a steady and unwavering hand among the difficulties that beset it, especially at a time when the accessories to the support of the Work were far more meagre than at present. The mass of volumes that bear his name on their title pages are a testimony to his industry and perseverance.

During nearly the same period, Dr. Carson has occupied the Chair of Materia Medica in the Philadelphia College of Pharmacy, wherein he has illustrated his favorite pursuits with an ability that has earned for him an enviable reputation as a teacher of that important branch of instruction.

It is not surprising therefore that the TRUSTEES of the UNIVERSITY OF PENNSYLVANIA, in making their selection of a teacher to fill the vacancy occasioned by the transfer of Dr. Wood from the chair of MATERIA MEDICA AND PHARMACY, to that of PRACTICE, should have given their preference to Dr. Carson, who, we are gratified to state, is the successor of Dr. Wood.

In view of his new duties, Dr. Carson has resigned his connection with our School of Pharmacy, and with this Journal, in an official capacity, but we believe the deep interest he has ever felt and manifested for the advancement of our profession and the interests of our Institution will continue, and whilst we regret the loss of his services, we cannot but rejoice at his removal to a more elevated and extended sphere of usefulness.

The Editorial duties of the Journal will now devolve solely on the remaining Editor, who will thank those who are in the habit of communicating with the Journal of Pharmacy to direct to "William Procter, Jr." In conducting the Journal it will be the endeavor of the Editor to preserve its scientific standing undiminished, and to increase its practical usefulness.

PHILADELPHIA COLLEGE OF PHARMACY.—The vacancy in the Chair of Materia Medica in this Institution, caused by the resignation of Professor Carson, has been filled by Dr. Robert P. Thomas of this city.

DRUG INSPECTORS.—We recollect distinctly during a period prior to the enactment of the law against the importation of adulterated and deteriorated drugs, medicines, and chemicals, when the probable usefulness of such a law was discussed, it was suggested that the officers appointed by the government to carry it out would be subject to removal for political creed, and all the advantages accruing from experience in office would be lost by frequent change, not to speak of the chances of unqualified men receiving the appointment. The moral, intellectual and educational fitness of the officer for the position cannot be too strongly insisted on in filling this station—it is not a mere question of dollars and cents between the government and the importers that he is called upon to arbitrate—it is whether deteriorated drugs shall be poured upon our shores from the rejected stock of Europe, to be bought up and dispensed by the unprincipled and the ignorant—it is whether adulterated medicines and chemical preparations shall be scattered far and wide over our country to disappoint the skill of the physician and render his weapons useless in their inactivity—it is whether the stricken one, prostrated by disease, the centre of deep and anxious sympathy, shall be hastened to the tomb through the impotency of medical agents which, when pure, are able to conquer and check its inroads. These are questions which the Honorable Secretary of the Treasury, Mr. Meredith, of Philadelphia, should have examined before he interfered with the action of this wholesome law, by removing an incumbent well qualified for the position by education and talent, and enjoying the confidence and respect of the Importers, Druggists and Physicians, of this city, and replacing him by—whom?! Is it true that the present incumbent enjoys the confidence and respect of that portion of the community with whose interests he is concerned? Is it true that he possesses that knowledge and those qualifications which a conscientious discharge of the duties of the office demand? If so, why is it that a remonstrance, the spontaneous expression of a highly respectable class in the community, should have gone to the appointing power? Better, far better, that the inspectorships had never been created, than by making their executors the subject of political reward for partizan services, to risk its being filled by men wholly unfit for the service, and whose inspection will be far from giving character to the drugs that pass through their hands.

Since the above was written, the Board of Trustees of the Philadelphia College of Pharmacy have felt themselves called upon to memorialise the Honorable Secretary of the Treasury in reference to this subject; and we hope that the Honorable Secretary will so far respect the appeal as to appoint some one, we care not whom, who is adequate to the discharge the highly responsible duties of this office.

IMPORTED PHARMACEUTICAL ARTICLES.—Our attention has been called to several pharmaceutical articles imported by George D. Phelps of New York, and among them may be mentioned, "Brown's cantharidin blistering tissue," "Brown's tissue dressing," and "Brown's water proof transparent plaster." It has long been usual in Europe to employ blistering tissues instead of the ordinary blistering plasters in which the flies are introduced in substance. When such tissues are fully impregnated with cantharidin they form a very elegant substitute for the cerate of cantharides spread on skin, and are equally certain. The tissue above noticed consists of a flexible paper covered uniformly with a layer of cerated extract of cantharides. At page 226 the reader will find a notice of this kind of preparation. We think they may be introduced with advantage into American pharmacy.

The article called "Brown's Tissue Dressing" consists of tissue paper covered on one side with a thin layer of rose colored cerate which has been impregnated with benzoin to prevent its becoming rancid. We do not know the composition of the cerate but presume it to be analogous to spermaceti cerate. Its odor is evidently that of benzoin, which substance is well known to possess the power of preventing in great measure the oxidation of fatty matter. For travellers, or for naval or military hospital purposes, we believe it will be found useful. We do not know how it keeps, nor whether it is applicable in all cases, but as a dressing for blisters it is a very elegant accompaniment to the blistering tissue. Each box contains twelve square feet of the tissue.

"Brown's water proof transparent plaster" consists of a coarse white gauze coated continuously with a layer or layers of gelatine prepared in some way. Why it is called water proof we do not know, as it is not impervious to water or saliva. It is very adhesive, but would, we think, be of questionable utility in cases where the surfaces was frequently moistened.

Hair gloves, straps, and flesh brushes, have of late years come into vogue as an auxiliary in those daily hygienic performances which are intended to keep up a healthy condition of the skin, by friction, with ablution or otherwise. We have examined several of the patent

gloves, straps and brushes of Lawrence & Co., as imported by Mr. Phelps, and from the neat and substantial manner in which they are made, believe them to be a superior article, and worthy the attention of druggists and physicians. Those gloves and straps which are intended for bath use, are constructed of material not injured by the water, whilst the flesh gloves and straps are lined with cotton or worsted velvet.

Coxe's patent refined sparkling gelatin is an elegant article, which we have tried and found to yield a beautiful jelly.

Murray's *fluid magnesia*, and *fluid camphor*, are among the preparations imported for druggists by Mr. Phelps. The first of these, which is a solution of carbonate of magnesia in carbonic acid water has justly fallen into disuse, as it is liable to change by keeping, owing to the escape of carbonic acid. The fluid camphor is a mixed solution of camphor and carbonate of magnesia in carbonic acid water. It professes to contain three grains of camphor and six of magnesia, in a fluid ounce, and is antacid and antispasmodic in its effect. We do not think that this fluid camphor contains more camphor than camphor water when prepared with three times its weight of carbonate of magnesia so as to divide it as much as possible.

POWDERED DRUGS.—Notwithstanding the many valuable improvements in the extraction of drugs, so as to present their active portion in a form more eligible for administration, many physicians prefer their use in substance and consequently require them in a pulverulent state. Whilst as a general rule, in those cases where the powders are rarely called for, we consider it advisable for apothecaries to perform the process of comminution themselves, both to insure their quality and have them recent, yet there are very many which it is a desideratum to obtain ready prepared and of approved quality.

The important points are, 1st, that these powders should be prepared from good drugs. 2d, they should be very fine or dusty. 3d, that they should be uniform in composition; that is to say, that each portion of the powder should represent equally every part of the substance comminuted, which can only occur when the results of an operation are mixed thoroughly, so as to commingle the more with the less friable ingredients. 4th, the powders should be secured from the air as soon as finished, to prevent the absorption of moisture, followed by mustiness or mouldiness, as the case may be. And lastly, when the drug contains a volatile ingredient, as is the case with Valerian, Diosma, Serpentaria, &c., that this or these be not dissipated to a greater extent than the most careful manipulation will demand.

Our attention was called to this subject by receiving some samples of powders from the laboratory of Charles Ellis & Co.

In judging these powders by the rules above hinted at, we believe them to be of superior quality. We were struck with those of buchu, orangepeel and others containing volatile oils, and those of gum, rhubarb, and aloes, where color is a criterion, as being particularly well prepared.

We have seen some powders from Haskell & Merrick of New York, which equalled those above noted, and we are gratified to perceive that more attention is being given to this class of preparations by our druggists.

PHARMACOPŒIA CONVENTION.—The decennial convention of Physicians and Pharmacutists for revising our National Pharmacopœia, met according to previous announcement, on the 6th of May, at the city of Washington. The delegates were not so numerous, and did not represent so extended an area of our population, as we would have been glad to have seen, being nearly altogether from the middle and northern states. The Convention was, however, larger than in 1840. The following statement by the Secretary of the Convention appeared in the National Intelligencer at Washington, except those portions enclosed in brackets.

NATIONAL MEDICAL CONVENTION,

For Revising the Pharmacopœia of the United States.

The fourth decennial convention for revising the Pharmacopœia of the United States, met at Washington on Monday, the 6th inst. The following delegates were present in the Convention :

From the Rhode Island Medical Society, Dr. JOSEPH MAURAN.

From the Geneva Medical College, Dr. JAMES BRYAN.

From the College of Pharmacy of the City of New York, Messrs. JOHN MILHAU and GEORGE D. COGGESHALL.

From the Medical Society of New Jersey, Drs. LEWIS CONDUCT and WM. A. NEWELL.

From the College of Physicians of Philadelphia, Drs. JOSEPH CARSON, HENRY BOND, and FRANCIS WEST.

From the University of Pennsylvania, Drs. GEORGE B. WOOD, and JAMES B. ROGERS.

From the Jefferson Medical College of Philadelphia, Dr. FRANKLIN BACHE.

From the Medical Faculty of the Pennsylvania College, Dr. H. S. PATTERSON.

From the Medico-Chirurgical College of Philadelphia, Dr. CLINTON G. STEES.

From the Philadelphia College of Pharmacy, Messrs. DANIEL B. SMITH, CHARLES ELLIS, and WILLIAM PROCTER, Jr.

From the Medical Society of Delaware, Drs. ISAAC JUMP and J. W. THOMSON.

From the Medical and Chirurgical Faculty of Maryland, Drs. DAVID STEWART and JOSHUA I. COHEN.

From the Medical Society of the District of Columbia, Drs. J. C. HALL and HARVEY LINDSLY.

From the National Medical College of the District of Columbia, Drs. JOSHUA RILEY, THOMAS MILLER, and EDWARD FOREMAN.

From the Medical Department of the National Institute, D. C., Drs. JAS. WYNNE and S. D. GALE.

From the Georgetown Medical College, Dr. F. HOWARD.

And from the Rush Medical College, Illinois, Dr. G. N. FITCH.

The credentials of delegates from the New Hampshire Medical Institution, the University of Buffalo, the Medical Department of Hampden Sidney College, the Medical Society of South Carolina, the Medical College of Ohio, the Cincinnati College of Pharmacy, the Missouri Medical Society, and the Medical Faculty of the University of Iowa, were presented by the Vice President of the Convention of 1840; but these delegates did not make their appearance during the session of the convention.

A temporary organization was effected by calling Dr. LEWIS CONDICT, President of the Convention of 1840, to the chair, and appointing Dr. HARVEY LINDSLY, Secretary. A committee of five was then appointed, consisting of Dr. Bache, Dr. Mauran, Dr. Thomson, Dr. Miller, and Mr. Coggeshall, to nominate the permanent officers of the convention, with instructions to name two Vice Presidents, in stead of one, as had been the custom on former occasions. This committee retired, and, after a short consultation, reported the names of the following delegates, viz:

For President, Dr. GEORGE B. WOOD, of Pennsylvania.

For Vice Presidents, Dr. JOSEPH MAURAN, of Rhode Island, and Dr. D. Y. SIMONS, of South Carolina.

For Secretary, Dr. HARVEY LINDSLY, of the District of Columbia; and for Assistant Secretary, Dr. EDWARD FOREMAN, of the same place.

The nominations were confirmed by the convention, and the President took the chair.

[A committee of three were appointed to examine the credentials of the delegates who reported in accordance with the preceding list.

It was on motion *Resolved*, that an invitation be extended to the Surgeon General of the Army, and the Chief of the Naval Bureau of Medicine and Surgery to sit with the Convention and take part in its proceedings.

And after some discussion, it was further *Resolved*, to invite such members of the two Houses of Congress as might be medical graduates, to participate in the deliberations of the convention.]

In conformity with the directions of the preceding convention, the Committee of Revision and Publication appointed by that body, presented a report of their proceedings, which was accepted.

The delegates of the several medical bodies represented in the

Convention were then called on for contributions towards the revision of the Pharmacopœia; when reports were handed in from the delegates of the Rhode Island Medical Society, from the College of Pharmacy of the City of New York, from the College of Physicians of Philadelphia, from the Philadelphia College of Pharmacy, and from the Medical and Chirurgical Faculty of Maryland. These reports were referred to a committee, consisting of Dr. Bond, Dr. Mauran, Dr. Cohen, Dr. Miller and Mr. Milhau, with directions to report a plan for the revision and publication of the Pharmacopœia; after which the convention adjourned to the following day.

At the next meeting, on Tuesday morning, a committee was appointed to examine the accounts and vouchers presented by the Committee of Revision and Publication of the preceding convention, and reported that they had found them correct.

Dr. Bond, from the committee to which had been referred the reports from various medical bodies represented in the convention, reported the following resolutions:

1. That a Committee of Revision and Publication, consisting of nine members, be appointed, to which shall be referred all communications offered to the convention in relation to the revision of the Pharmacopœia, and that three of this committee shall form a quorum.
2. That the committee shall meet in the city of Philadelphia, and be convened as soon as practicable by the chairman.
3. That said committee shall be authorized to publish the work after its revision, and to take all other measures which may be necessary to carry out the views and intentions of the convention.
4. That the committee shall have power to fill its own vacancies.
5. That, after the completion of its labors, the committee shall submit a report of its proceedings to the Secretary of this convention, to be laid before the next convention.

These resolutions were adopted, and the following delegates appointed on the committee, viz.: Dr. Franklin Bache, Dr. Joseph Carson and Mr. William Procter, Jr., of Philadelphia; Dr. Joseph Mauran, of Providence, Rhode Island; Mr. John Milhau, of the City of New York; Dr. J. W. Thompson, of Wilmington, Delaware; Dr. David Stewart, of Baltimore; Dr. Joshua Riley, of the District of Columbia; and Dr. G. N. Fitch, of Logansport, Indiana.

It was resolved that the President of the convention be added to the above committee, and serve as its chairman.

[Mr. Coggeshall suggested the propriety of restoring the Latin version of the Pharmacopœia as it existed previously to the revision of 1840, as recommended in the report of the New York College of Pharmacy. After a full and spirited discussion of the question in point of expediency, in which the increasing disposition of Pharmacopœial authorities to drop the classical and adopt the vernacular was shown, the recommendation was unanimously *negatived*.]

In reference to the manner of calling and the mode of constituting the next decennial convention, to meet in the year 1860, it was

Resolved, That the regulations in reference to the present conven-

tion, adopted by that of the year 1840, and published in the last edition of the Pharmacopœia, should be adopted, with the necessary modifications in relation to the dates; the day of meeting being changed from the first Monday to the first Wednesday in May.

A letter was read inviting the members of the convention to a dinner, to be given at the National Hotel, by the medical gentlemen of Washington and Georgetown. The invitation was accepted, and the thanks of the convention voted to the gentlemen referred to for their hospitality.

The thanks of the convention were also unanimously voted to Dr. Lewis Condict, President of the last convention, for valuable services; and to the Board of Aldermen, of the city of Washington, for their courtesy in offering their hall for the sittings of the convention.

The convention then adjourned.

After its adjournment, Dr. William B. Chapman, one of the delegates from the Cincinnati College of Pharmacy, arriving in Washington, stated to the Secretary his concurrence in the proceedings of the convention.

HARVEY LINDLEY, M. D.,
Secretary of the Convention.

It will be perceived that the profession of Pharmacy was represented in the Convention, and that a part of the Revising Committee are pharmacutists. It may interest some of our readers to know that this Committee has been organized and has commenced its labors. For the information of the members of the Convention, and others who may feel an interest in the object of its appointment, we will state that the Committee meets every Thursday evening in this city. As it is desirable that the work should be national in its character, and embrace within its contents well digested formulæ suited to the *established* wants of all sections of our country, the joint medical and pharmaceutical interests of places not represented by the delegations above indicated, should make known to the Committee such important formulæ and facts as may in their opinion be worthy of its consideration.

GENERAL INDEX.—Our readers will perceive that the General Index to the American Journal of Pharmacy, commenced in the last number, is completed in the present. Subscribers would do well to have the Index bound with the current volume, or what is much better, bound separately so as to be more easy of reference. The utility of this work to those who have frequent occasion to refer to the Journal will be immense; and even where it is used but occasionally, to find a formula, or to verify a statement, its convenience will be readily acknowledged. As our friend Alfred B. Taylor, to whose industry we owe the pleasure of presenting the Index to our readers, declines attaching his name to it, we take this means of informing them to whom they are indebted.

PATENT MEDICINE TAX.—Among the ways and means resorted to by our State authorities to increase the revenue, is a tax laid on the sale of secret or quack medicines, as has long been the usage in England. We have been informed that this law originated at the suggestion of some physicians, who supposed it would bear more specially on empirics and their nostrums, but the executors of the law have interpreted it to apply to all who sell preparations made by secret formulæ, as Henry's and Husband's Magnesia, McMunn's Elixir, and others prescribed by physicians. Now as there are druggists who feel a desire to discourage quackery, and act up to their profession by refusing to sell secret medicines in general, and yet necessarily keep such preparations as the above, it is unjust that they should be taxed as though they were general dealers in nostrums.

The Druggists General Receipt Book: containing numerous recipes for patent and proprietary medicines, druggists' nostrums, &c.; factitious mineral waters, and powders for preparing them; with a veterinary formulary and table of the Veterinary Materia Medica; also recipes for perfumery and cosmetics, beverages, dietetic articles and condiments; trade chemicals, miscellaneous compounds, used in the arts, domestic economy, &c.; with useful tables and memoranda. By HENRY BEASLEY. Philad., Lindsay & Blakiston, 1850. Octavo, pp. 386.

The title of Dr. Beasley's book tells its character; it is in fact a cluster of recipes for medicines, perfumery, soap making, paints, cosmetics, in fact for a thousand things useful and useless, which have become more or less identified with the drug business, and as a book of reference will often be found useful to business men.

OBITUARY.—We have to announce the death of Dr. ROBERT EGLESFELD GRIFFITH, in the 53d year of his age, at his residence on Chestnut street in this city.

Dr. Griffith has long been known as a medical writer and teacher, as well as for his general scientific attainments, especially in botany and conchology. In 1831, on the death of Dr. Benjamin Ellis, he assumed the Editorship of this Journal, then known as the "Journal of the Philadelphia College of Pharmacy," and conducted it until 1836. In the spring of 1835, on the election of Dr. Wood to the University, he was appointed to the vacant chair of Materia Medica in the School of Pharmacy, where he delivered one course of lectures. The following year Dr. Griffith was elected to the same chair in the University of Maryland, which he occupied several years, and subsequently accepted a lectureship in the University of Virginia. His health,

at this time so far declined, owing to an affection of the heart, as to render it necessary for him to resign his duties and seek restoration in the milder climate of the West Indies, at Santa Cruz, where he spent the winter. On his return from the South, Dr. Griffith occupied himself with experimental agriculture near Baltimore, and gave free scope to his enquiring mind in that interesting pursuit. He left Maryland in 1842, and has since resided near and in his native city, closely engaged in literary pursuits, chiefly of a medical and botanical character. During this period, "Griffith's Medical Botany," and "Griffith's Universal Formulary," both original works, have issued from his pen, and several foreign works have been republished here under his supervision, the most prominent of which is "Dr. Christison's Materia Medica."

Dr. Griffith was for many years an active member of the Academy of Natural Sciences, and at the time of his death was one of its Vice Presidents. His love of science was ardent and enthusiastic, and was manifested in his correspondence with many of the first scientific minds of Europe.

His health during the past few years has been extremely precarious, so as to confine him almost entirely to the house during the winter season, notwithstanding which, his industry has been unfailing.

As a man, Dr. Griffith was so cheerful and amiable as to endear him to all his associates, and so unassuming as to be approachable by all who desired to draw from the stores of knowledge which his observant mind and very retentive memory had enabled him to accumulate, the accuracy of which his friends have frequently had occasion to admire. His cheerfulness never forsook him during the many trying domestic afflictions which have marked the latter period of his career, and which he bore with great fortitude and resignation.

On Wednesday, May 8th, the decease of the justly celebrated Chemist, GAY LUSSAC, took place at Paris

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OCTOBER, 1850.  
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ART. LXIV.—OBSERVATIONS ON COPAIBA.

BY WILLIAM PROCTER, JR.

Copaiba as a drug, under the name of Balsam of Copai-
va, has been known and written about for more than two
hundred years, and its valuable remedial powers have at-
tracted and received the deliberate attention of physi-
cians, pharmacutists, and chemists, for many years past.

The genus *Copaifera* is an extensive one; its species
though occurring most largely in the forests of Northern and
Eastern Brazil, are found in those of Guiana, Venezuela, and
in some of the West India Islands. As yet no writer has
described accurately the botanical sources of the several
kinds of copaiba found in commerce, nor have travellers
satisfactorily ascertained whether each of these is invariably
the product of a single species of *Copaifera*, or whether they
are sometimes the mixed products of several species grow-
ing together in the region of collection. "According to
Hayne, the species from which most of the copaiba of com-
merce is derived is the *C. multijuga*, growing in the pro-
vince of Pará." (U. S. Disp.) But the *C. Martii* of Hayne,
and perhaps other species, grow in that neighborhood, and
may contribute to the Pará balsam. The copaiba derived
from the vicinity of Rio Janeiro is attributed to *C. Langs-*

dorffii and *C. coriacea*, but the sources of the Angostura, Maracaibo, and West Indian drugs are quite uncertain, although attributed to *C. officinalis*. It is to be regretted that so accurate an observer as Dr. Weddell, did not investigate the *Copaiferas*, whilst a sojourner in South America.

The extensive demand for copaiba has caused it to be sought in various localities, and from numerous species; and it is probable that climate, and the modes of extraction and preservation, taken in connection with its variable botanical origin, may be referred to as the most prominent and active causes of the remarkable variations in the sensible properties and chemical constitution of the drug itself. It is with a view of throwing some additional light on this subject that the writer has hazarded an opinion in relation to the collection of some specimens of the drug, found in commerce of late years, which he has not as yet been able to verify or disprove, by information obtained from their geographical sources, but which is based on observations made on the effects of age and exposure on copaiba, and its volatile oil.

In approaching the subject, it will be viewed 1st, in reference to the proximate constituents of copaiba. 2d. The proportional relation of these in the copaibas of commerce. 3d. The causes existing and acting, before and after the juice is extracted, which modify the quantitative relation of its constituents. And lastly, conclusions.

1st. The proximate constituents of copaiba, from whatever source, are volatile oil and resin, with a minute portion of some soluble organic acid (probably the acetic or succinic) and in some instances fatty matter.

The *volatile oil of copaiba* is constituted much like that of turpentine. Its equivalent is $C_{10} H_8$ which makes it isomeric with the oil of lemons, and just one half of that of oil of turpentine. It forms a crystalline artificial camphor with hydrochloric acid gas, which differs from those of the oils of turpentine and lemons. Its specific gravity is .878 ;

it boils at 473° F. but undergoes a slight alteration unless oxygen is excluded ; it is very soluble in anhydrous alcohol, but much less so in that of officinal strength (.835). It is the cause of the peculiar penetrating odor of copaiba, and has a biting extremely disagreeable persistent taste. Durand first ascertained it to be a hydro-carbon by noticing its indifference towards potassium, which keeps well in it. It is gradually resinified by exposure to the air.

The resinous portion of copaiba consists of two distinct substances : one of these is a strong resinous acid to which the name of *copaivic acid* has been given. The other is neutral, incapable of uniting with bases, has a permanently soft consistence, is soluble in anhydrous alcohol and ether, and insoluble in weak alcohol, and mineral naphtha.

Copaivic acid is inodorous, nearly insipid, soluble in ether, alcohol, and the volatile oils, and its alcoholic solution reddens litmus paper. It forms combinations with bases which are generally soluble in ether and alcohol. It has the same ultimate composition as colophony, the resin of European turpentine, $C_{40} H_{32} O^4$. It is usually amorphous like ordinary resin, but Schweitzer has obtained it in colorless crystals. Its salt of magnesia is the basis of the officinal copaiba pills.

2d. Let us now examine the proportional relations of these constituents as they occur in the copaibas of commerce.

According to the analysis of Stoltze copaiba contains 38. of volatile oil, 52.75 copaivic acid, 1.66 soft resin, 7.59 water and loss.

Gerber's analysis of fresh copaiba gives 41. volatile oil, 51.38 copaivic acid, 2.18 soft resin, 5.44 water and loss.

Gerber's analysis of old copaiba gives 31.7 volatile oil, 53.68 copaivic acid, 11.15 soft resin, 4.1 water and loss.

Durand found 50 of volatile oil and 50 of resin, including a little fatty matter, acetic acid and perhaps water, without isolating the copaivic acid.

According to Guibourt, copaiba yields 45 volatile oil, and the resinous residue consists of 98 parts of copaivic acid and 2 parts soft resin.

Mr. Whipple (Pereira) obtained 48 per cent of resin and 52 per cent of volatile oil.

In addition to the above I have examined five specimens of copaiba obtained at different times in the Philadelphia market, and also a sample of oil of copaiba which had been kept long in a bottle imperfectly stopped until it became slightly resinous and more viscid than copaiba itself. As a means of distinguishing them I will attach the letters of the alphabet. The method adopted to ascertain the amount of oil and resin was to place a weighed quantity, say 100 grains, of the specimen in a small weighed capsule and expose it to a regular heat at about 250° F. until the oil was evaporated and it ceased to lose weight. The capsule was then weighed and the loss ascertained. Although this method of analysis is not so accurate as distillation with water, using a larger quantity, and weighing the distilled oil and the residue resin separately, yet it is sufficiently precise to answer the object of the writer.

(a.) This specimen was remarkable for being very slightly resinous. Its specific gravity was only .916; its odor purely that of copaiba; it was light straw colored, very fluid, and consisted of 80 parts of volatile oil, and 20 parts of resin. The latter was soft, adhered to the fingers, and was slightly acid to litmus when dissolved in alcohol. The origin of this specimen is uncertain, but it is believed to be from Pará. Sixty grains of it was heated several minutes with one-sixteenth of recently calcined magnesia, and set aside twenty-four hours. No combination ensued: the magnesia settled to the bottom, the copaiba remaining transparent above it.

(b.) Origin unknown, consistence rather thin, odor good color brownish yellow, and sp. grav. .956. It consisted of 65 parts volatile oil, and 35 of resin; when heated

with one-sixteenth of magnesia and set aside 24 hours only partial union followed, a part of the magnesia precipitated, and a part was taken up by the oleo-resin, which remained turbid.

(c.) This specimen has a thick consistence, its sp. grav. .983, is several years old, but its origin is not known, although it looks like that from Angostura. It consists of 50 parts of volatile oil, and 50 parts of resin. The resin is pulverizable, and quite acid to litmus when dissolved in alcohol. Heated with one-sixteenth of magnesia, it became tolerably consistent on cooling, but did not acquire a pillular consistence after 36 hours.

(d.) This sample obtained as Angostura copaiba, has a density of .985, is transparent, has a light brown color, correct odor, and thick consistence. It consisted of 35 parts of oil and 65 of resin. The resin was not fragile and pulverizable, but soft and sticky between the fingers. Heated with one-sixteenth of magnesia, it acquired on cooling, a thick consistence, and at the expiration of 36 hours its consistence was firmer than that of c. The resin was quite acid to litmus.

(e.) This specimen has been in my possession several years, it was obtained as "solidifiable balsam," but its origin is unknown. Its color dark yellowish brown, consistence thicker, its odor more aromatic than either of the preceding, and its density .986. It consisted of 34 parts of volatile oil and 66 parts of resin, the alcoholic solution of which was strongly acid to litmus paper. When heated with one-sixteenth of magnesia, its consistence was almost pillular on cooling, and after 24 hours was fit for use.

(f.) This specimen was oil of copaiba obtained by distillation, that had been kept five years in a cracked bottle, so as to admit the air. Its consistence is thicker than either of the preceding copaibas, has a bright amber color, is perfectly transparent, readily soluble in commercial alcohol, and its solution hardly reddens litmus paper. It consists of volatile oil 66, soft resin 34.

When mixed with one-sixteenth of magnesia and allowed to stand five days, no combination ensued; it was then heated, with no increase of solidity, except what might be attributed to loss of oil; in other words, though thick and resinous, it is not solidifiable, because it contains no copaivic acid.

The following table exhibits these results at one view.

	Stoltze	Gerbers fresh co- paiba	Gerbers old co- paiba	Durand	Gui- bourt	Wip- ple	a	b	c	d	e	f
Volatile oil.	38.	41.	31.7	50	45.	48.	80	65	50	35	34	66
Copaivic acid.	52.75	51.38	53.68	} 50.	53.9	} 52	} 20	} 35	} 50	} 65	} 66	} 34
Soft resin.	1.66	2.18	11.15		1.1							
Water & loss.	7.59	5.44	4.10									

By a comparison of these results, we are first struck with the great variation in the proportion of volatile oil, which varies from 31 to 80 per cent. Second: in the three first and the fifth analyses, the ratio of copaivic acid is nearly equal, while the soft resin varies from 1.66 to 11.15 per cent., being greatest in the oldest. Third: that only three specimens, containing from 50 to 60 per cent. of resin will solidify. Fourth: that the resin in the specimen *a* differs from all the rest both in color, consistence, and want of acidity, the copaiba being apparently immature; and lastly that in the spontaneous oxidation of copaiba and its volatile oil, it is the soft resin only that is formed.

3d. The causes modifying the proximate constitution of copaiba, existing and acting before and after the extraction of the juice, are several.

It is an ascertained fact that the ascending juices of plants, particularly of trees, are much more simple than those which descend, after having passed the circulation of the leaves; and the principles deposited by the downward current contain more carbon and less oxygen, than those contained in the ascending current. This arises from the chemical changes going on in the leaves during the action of light on them, by which oxygen is evolved from the carbonic acid and other constituents of the juices. "Their green

leaves absorb the chemical rays of the sun so completely as to give no image in the daguerreotype." (*Graham.*) This deoxidizing and carbon-depositing action appears to go on to a much greater extent in oleiferous and resiniferous plants than in others.

Now it appears from observations made by different observers, that as the copaiba trees get older, their juices become more oleo-resinous, that is to say, the process of oxidation to which the volatile oil is subjected, causes it to become more resinous, year after year; and it is only after a certain age, that, in the opinion of the copaiba collectors, the trees are fit to be tapped. The analysis of Rose proves that copaivic acid is the oxide of the oil of copaiba; thus the formula of the acid is $C^{40} H^{32} O^4$ whilst that of the oil is $C^{10} H^8$, which quadrupled $= C^{40} H^{32}$, and this plus O^4 = the formula of the acid.

Again; as the juices of the older trees are more resinous, the juices of the younger trees are more oily and less resinous, and beyond doubt there is a period in their growth when the volatile oil is associated with comparatively little resin. Now the writer is willing to hazard the opinion that the specimen of copaiba distinguished by (a) in the table was extracted at this period of the growth of the tree, when not only the oil was in great excess, but the resin not completely elaborated, in other words, not converted into copaivic acid. This view is indirectly corroborated by the fact that there are one or two oleo-resins, containing but a trifle of resin, which are obtained by tapping, from trees, growing in Venezuela. One of these, called "native oil of laurel or sassafras," obtained from trees growing on the banks of the Orinoko, about 400 miles from its mouth, is now under examination, and will be noticed in the next number.

The judgments of the medicinal value of copaiba, have generally been based on its consistence and solidifying property. The observations of writers on therapeutics, have shown that early all its peculiar efficacy is due to the volatile oil. If

this is true, and there appears no reason to doubt it, the "solidifiable balsam" is the least valuable as a medicine, and it becomes an important question whether the practice of extracting the juice from the older trees is the most eligible? It is for therapeutists to ascertain whether such copaiba as (*a*) is or is not better than such as (*e*.)

It is apparent from the analyses above detailed, that copaivic acid is a *natural* product formed in the juice of the plant, and not after its extraction, by exposure to the air. The examination of old copaiba by Gerber, and of the specimen (*f*) of old oil of copaiba by the writer, especially show this; hence if any given specimens of the drug be not naturally possessed of about 50 per cent. of copaivic acid, no subsequent oxidation will render it solidifiable.

The soft resin formed by oxidation of the oil appears to give more consistence to the drug weight for weight, than the copaivic acid, probably from being less soluble, and hence old copaiba is not only thicker in consistence from loss of volatile oil, by evaporation, but from the formation of the soft resin. It is highly probable that specimens of copaiba may be met with, which, originally immature, and slightly resinous, have become thick and resinous from exposure. Such copaiba will not solidify, for the causes mentioned. The remarks by Joseph Laidley at page 121 of this volume, tend to corroborate some of the statements in this paper, whilst these explain the difficulties met with by that writer.

ART. LXV.—ON SOME PHARMACEUTICAL PREPARATIONS OF MANGANESE.

BY WILLIAM PROCTER, JR.

Within a short period the attention of medical men has been attracted to the salts of manganese as remedial agents, chiefly through the published views of M. Hannon, contained in the *Revue Medico-Chirurgicale de Paris* for June 1849, where an account of several pharmaceutical preparations of the metal may be found. The American Journal of the Medical Sciences for January and April of the present year contains a translation of M. Hannon's observations, but as the author assumes that the apothecary is provided with pure sulphate of manganese, from which to make the other salts he describes, and does not give very eligible processes for several of the preparations recommended, it will be better to begin at the native black oxide, which is cheap and readily obtainable from the druggists, and describe the most convenient processes for obtaining the salts. The quantities mentioned are purposely small to suit those pharmacutists who may incline to supply themselves.

Carbonate of Manganese. Take a pound of black oxide of manganese, of good quality, in fine powder, put it in a porcelain or stone ware dish, placed on a sand bath, or other source of heat, pour on it two pints of common muriatic acid, and stir them well. Chlorine gas is evolved, which should be avoided by the operator, by performing the operation under a chimney, or furnace hood, or in the open air. Muriatic acid should be added from time to time, until all is dissolved, but the earthy impurities. The solution of chloride of manganese, thus obtained, contains free muriatic acid and sesquichloride of iron, to get rid of which, proceed as follows. Make a strong solution of carbonate of soda, add it gradually to the solution of manganese until the excess of acid is neutralized; the carbonate of manganese at first thrown down being redissolved,

then heat the solution to ebullition, and pour in the solution of carbonate of soda from time to time, boiling after each addition, until the carbonate of manganese which it precipitates is free from sesquioxide of iron. This is easily ascertained by filtering off a few drops of the boiling solution, and adding to it a solution of yellow prussiate of potassa. If all the iron is separated, a white precipitate is produced, but if some yet remains, it will have a tinge of blue more or less deep, and of course more carbonate of soda should be added till the iron is all separated.

Filter the solution from the oxide of iron, and add to it an excess of carbonate of soda; a bulky white hydrated carbonate of manganese precipitates, which should be washed with cold boiled water, and thrown on a cloth to drain. It is now ready for the preparation of any of the soluble salts of manganese by solution with their respective acids, as the sulphate, chloride, malate, tartrate, acetate, etc.

Carbonate of manganese is a white or pale rose colored powder, insoluble in water, and when heated much above 100° F. is changed by its base passing to a higher degree of oxidation. It consists of two equivalents of protoxide of manganese, two equivalents of carbonic acid, and one equivalent of water. For medical purposes it may be used in three forms, viz.:

1st. *Pure* in powder obtained by drying the moist carbonate above described at a temperature below 100° F. in a drying room or by spontaneous evaporation. It may be given in pills, powders, or mixed with syrup or mucilage.

2nd. *In powder united with sugar*, prepared by mixing the moist washed and pressed carbonate, obtained by precipitating ten ounces sulphate of manganese with an excess of carbonate of soda, with four ounces of sugar in powder, and evaporating the moisture from the mixture on a water bath at a temperature not exceeding 130° F. till it is dry. This which may be called the *saccharine* carbonate of man-

ganese is then reduced to powder and preserved for use. It consists of about two parts of carbonate to one of sugar, the object of which is to preserve it from oxidation. It may be given in powder, pills, or mixture, as the prescriber may desire.

3rd. *Combined with honey*, in a pillular form like Vallet's carbonate of iron as recommended by M. Hannon, who gives the following formula. "Dissolve seventeen ounces of crystallized sulphate of manganese, and nineteen ounces of carbonate of soda, each in two pints of water containing two fluid ounces of syrup; mix the solutions thoroughly, and suffer the precipitate to subside in a well stopped bottle. The supernatant liquid is decanted off, the precipitate washed with sweetened water and thrown on a cloth saturated with simple syrup to drain. It is then expressed, mixed with ten ounces of honey, and rapidly evaporated, (the access of air being prevented) to a proper consistence for making pills. The sugar and honey prevent the oxide of manganese from super oxidation. The dose is from four to ten pills, each four grains, every day, in chlorotic cases where iron has not succeeded. The hyperoxidation of carbonate of manganese may be prevented by adding freshly prepared vegetable charcoal to the pills."

Sulphate of manganese. On a small scale, pure sulphate of manganese may be prepared thus:—

Take four ounces of sulphuric acid, mix it with twelve fluid ounces of water, and add moist hydrated carbonate of manganese, gradually, until the acid is saturated. Filter the solution, which has a light amethyst color, evaporate it at a moderate temperature, till a crystalline pellicle commences to form, then set it aside in a drying closet, or for spontaneous evaporation. If an attempt is made to hurry the evaporation by ebullition a sub-hydrated sulphate is thrown down in fine powder.

On a larger scale this salt may be prepared directly from the native oxide, by mixing ten pounds of the black oxide

intimately with one pound of finely powdered bituminous coal, and heating the mixture in a covered iron or earthen crucible for half an hour at a red heat. The presence of the carbonaceous matter at the high temperature, reduces the manganese to the state of protoxide. When cold, the mass is reduced to powder, and treated with ten pound of sulphuric acid diluted with three gallons of water till the oxide is dissolved out. One-sixth of the filtered solution is precipitated with carbonate of soda, the impure carbonate of manganese washed with water, added to the remainder of the solution, and boiled until ferrocyanuret of potassium ceases to cause a blue precipitate when added to a drop of it. The liquid is then filtered, evaporated, till a pellicle commences to form, at a gentle heat, and set aside to evaporate spontaneously in shallow vessels.

Sulphate of manganese is white, or slightly amthiest-colored, has a styptic taste, crystallizes in rhomboidal prisms, and is soluble in two and a half parts of cold water, and more soluble in boiling water. It is insoluble in alcohol, and an easy way to isolate the sulphate from its solution on a small scale, is to add to a saturated solution its bulk of alcohol. Its amount of water of crystallization varies. When crystallized at or under 42° F. it contains 7 equivalents of water; between 45° and 68° it contains 5 equivalents of water; from 68° to 86°, it has but 4 equivalents of water. (*Graham.*)

Syrup of Iodide of Manganese.—M. Hannon has given a formula for syrup of iodide of manganese, in which he directs a drachm of carbonate of manganese to be dissolved in sufficient liquid, hydriodic acid, and the solution added to seventeen ounces of syrup of guaiacum and sarsaparilla; but this proportion is too weak, and besides is objectionable, on account of the menstruum, in certain cases. The following process gives a more concentrated solution in simple syrup, pure, with the exception of a small quantity of sulphate of potassa, which is inert.

Take of Crystallised sulphate of manganese, 16 drachms.

Iodide of potassium, 19 “

Sugar, and water, each a sufficient quantity.

Dissolve the sulphate of manganese and iodide of potassium each in three fluid ounces of cold water, containing two drachms of syrup, and mix them in a glass stopped bottle, and after the crystals of sulphate of potash cease to precipitate, throw the solution on a filter of fine muslin, and allow it to pass into a pint bottle containing twelve ounces of powdered sugar. When the solution has ceased to pass, wash the filter with a little water, and then add sufficient of that fluid to make the whole measure one pint. Finally agitate the bottle until the sugar is all dissolved. This preparation contains about one drachm of solid iodide of manganese to each fluid ounce, which is the strength of the officinal solution of iodide of iron.

The dose varies from ten drops to half a fluid drachm.

Pills of Iodide of Manganese.—M. Hannon recommends these to be made by mixing equal quantities of iodide of potassium, and dried sulphate of manganese, and forming a mass with honey, which should be divided into pills, each containing four grains. They should be kept in a well stopped bottle. The dose is one pill daily, gradually increased every three days to six pills. They are then omitted eight days, after which their use is resumed.

Phosphate of Manganese.

Take of Sulphate of manganese, four ounces.

Phosphate of soda, five ounces.

Water, a sufficient quantity.

Dissolve the sulphate and phosphate severally in two pints of water, mix the solutions, wash the precipitated phosphate, till the sulphate of soda is removed, press it between the folds of bibulous paper, and dry it at a moderate temperature.

Phosphate of manganese is a white, nearly insoluble powder. M. Hannon gives formulæ for pills, syrup and

lozenges. The pills contain each three grains of phosphate and one of Peruvian bark, made into form with syrup of catechu.

Malate of Manganese is recommended as one of the best preparations of this metal for medical use. It is made by saturating a solution of malic acid with carbonate of manganese. The scarcity of the acid renders this salt too expensive for general use; but should it really merit the preference to others more readily attainable, and be in demand, the following is, perhaps, the most eligible process. The malic acid is derived from sumac berries (*Rhus glabrum*) as recommended by Prof. W. B. Rogers (*Amer. Jour. Pharm.*, vol. 7 p. 56;) the red exterior coating of which contains a considerable amount of bi-malate of lime.

The berries, deprived of their supporting peduncles, are infused in boiling water, without bruising, until the acid salt is dissolved out. The infusion is filtered through cotton flannel, evaporated to a syrupy consistence, and set aside to crystallize. The bi-malate of lime readily separates in regular crystals: these are drained, dissolved in a small quantity of boiling water, and again crystallized by cooling. The bi-malate is redissolved in the smallest possible quantity of boiling water, and diluted sulphuric acid dropped in carefully, until it ceases to produce a precipitate. Allow the solution of malic acid to cool, separate the precipitated sulphate of lime by a filter, and wash out the malic acid which adheres to it with a little water. Lastly, saturate the solution of malic acid with carbonate of manganese, filter and evaporate carefully by a water bath.

M. Hannon recommends malate of manganese in the forms of syrup, pills, and lozenges. The syrup is made by dissolving one ounce of the salt in a pint of simple syrup. He also remarks, that "the preparations of manganese have this immense advantage over those of iron, that they can be combined with vegetable tonics and astringents, viz: tannin, and the substances which contain it; as gall-nuts, rhatany, catechu, dragon's blood, kino, monesia, cinnamon,

and cinchona. These can all be combined with malate of manganese."

"In cases where iron has not succeeded, it is desirable not to make a sudden transition to manganese, but to combine the two remedies, as in the following formula. Pure crystallized sulphate of iron, 13 ounces; pure sulphate of manganese, $3\frac{1}{2}$ ounces; pure carbonate of soda, $17\frac{1}{2}$ ounces; honey, 10 ounces; syrup, as much as may be sufficient to make a mass, to be divided into four grain pills. Dose, from two to ten pills daily. The insoluble preparations of manganese should be first used as the carbonate, phosphate, and oxide; then the more soluble preparations, the tartrate, malate, &c., may be employed. The use of this medicine should not be persevered in so long as that of iron, as its preparations are more rapidly assimilated."

ART. LXVI.—ON THE CULTIVATION OF WORMSEED, AND
ON THE PREPARATION OF ITS OIL, AS CONDUCTED
NEAR BALTIMORE.

[The substance of the following remarks was received in a communication from a druggist in Baltimore, with permission to publish any part of it which we might deem useful to our readers. The gentleman, though urged to let his name appear, modestly declines, but we can vouch for his credibility.—EDITOR.]

Oil of Wormseed (*Chenopodium anthelminticum*) was formerly much more used in this country than it is at present. We believe the disrepute into which it has fallen with physicians has chiefly arisen from the large amount of the oil brought from the Western States, the best of which, although raised from Baltimore seed, possesses much less of the peculiar fragrance and pungency of the Baltimore oil. Some druggists mixed it with the latter, and others sold it aequal in value; but experience has proved them to be in

error. A few druggists, vermifuge venders, and physicians, however, persisted in selling, using, and prescribing the Baltimore article, and it has gradually come into more general use ; and vermifuge makers, knowing its value, use it exclusively.

The soil in this vicinity appears to be particularly adapted to the developement of the activity and value of the wormseed plant. About twenty or thirty miles north of Baltimore, some fifty or sixty persons grow the plant in small or large patches on their land. Newly cleared ground is said to be most productive. The seed are sown early in the Spring in small beds of good soil, like cabbage seed, and the process of cultivation is similar to that for cabbage. If the season proves favorable, the plants will be ready to set out during the month of June. They are planted in ridges three feet apart, the plants in the rows to be from six to ten inches apart. The succeeding year the roots, which are perennial, will yield another crop more productive in oil than that of the first year, and do not need replanting for four or five years. The plants attain the height of from two to four feet, and are ripe for distillation generally between the first and fifteenth of September, which is known by the tops turning yellow ; the stalks are cut from 6 to 10 inches above the ground, in fact all the herbaceous portion. Some seasons the plant yields more oil than others, [a fact equally applicable to all annual volatile oil yielding plants.] An acre produces sufficient to yield twenty pounds of the oil, and as from 50 to 70 pounds of the plant are required to yield one pound of oil, that is from $1\frac{1}{2}$ to 2 per cent., it follows the yield is from a half to three quarters of a ton of the fresh plant per acre. It is distilled after it has been gathered two or three days. The average annual product is about twenty-five hundred pounds of oil. The growers distil the oil themselves. The apparatus now employed by them is the same as that used forty years ago, and consists of an

iron pot of from three to six gallons capacity with a soap stone head or cap, into which a gun-barrel is fitted, which latter is kept cool by a stream of water, and acts as the condenser. The pot is permanently built in brick work so as to form a fireplace beneath. The soap stone capping consists of two pieces; one about four inches thick, and penetrated by a hole eight or ten inches in diameter, is cemented on the top edge of the pot. The gun barrel passes through the side of this stone and opens into the interior. The other soap stone is a circular flat piece lying on the first, completely covering the opening, and forms a steam tight joint, the two being ground to fit accurately. A spot is selected near a running spring, when possible, so as to facilitate the refrigeration. The whole plant is used, which is forced down into the pot until it is full, and then water poured on till the interstitial space is nearly filled, when the cap is replaced and the process commenced. The charge in each five gallon pot yields about one ounce and a quarter of oil, and requires about 20 minutes to distil it. The distillers object to distil the seed tops alone as clogging the still. The oil is brought to market in lots of from half a pound to fifty pounds or more, principally in the fall and along through the winter, some holding on till spring for a better price. The average cost price is from two and a half to three and a half dollars, although some assert that it will not remunerate the producer under four dollars. The oil as obtained from different growers, has generally the same appearance—a pale straw color when recent, whilst Western oil is much darker. The Baltimore oil sometimes has an empyreumatic odor when it has not been prepared with the usual care, [a fact easily accounted for when we consider the apparatus. Indeed it is hardly credible that in view of the easily attainable means of distillation on a large scale, that the old habits of those wormseed oil distillers should be persisted in.—ED.]

The following receipt for administering oil of wormseed

has been extensively tried, and has proved more effectual than when given alone.

R	Ol. Chenopodii (Baltimore)	ʒiss.
	Ol. Ricini	ʒiij.
	Ol. Anisi	gttx.
	Syrupi Rhei et Sennæ	fʒi.

Mix the three first ingredients, then add the syrup, heat the mixture gently, and agitate it well.

In administering this preparation the vial should be shaken, a teaspoonful given to a child one year old, two teaspoonsful to one or two or three years old, and so in proportion to age. It should be given at night, and in the morning before breakfast.

ART. LXVII.—ON DISPLACEMENT.

BY JOHN HARRIS, M. D.

May not some of the difficulties in the process of displacement be obviated by a proper use of the stop-cock?

These difficulties arise, for the most part, from improper comminution of the material to be acted upon, and improper packing of it in the displacement cylinder.

If the material, or any large proportion of it, be too finely pulverized, the fluid will pass too slowly, or not at all; if too coarsely, it will pass too rapidly; if unequally, it will form channels through which only it will travel, leaving other portions of the mass untouched.

The same consequences result from too much, too little, or unequal pressure in packing. But, to preserve, in all cases, a proper state of comminution, and proper packing, calls for the exercise of more care, and of more judgment, enlightened by experience, than can generally be expected.

Now, let the material to be acted on, be so coarsely disintegrated and lightly packed as to permit a *sufficient*-

ly rapid passage of the fluid, and all the other inconveniences may, it seems to me, be obviated simply by *regulating the rapidity* of its flow by means of the stop cock. The operator should keep in mind the swelling of the dry materials when penetrated by the menstruum, and guard against the too great compactness which might thus be produced. To this end let the maceration be performed before putting the materials into the displacement vessel.

Be sure that the flow of the fluid from the displacement cylinder is not much more rapid than its subsidence through the most compact part of the mass, and you secure the great object of subjecting every part of the mass to the action of each successive stratum of the fluid.

Lastly, let the flow be by such slow degrees as to give *time* for the solvent action of the fluid, and the great advantages of the process of displacement are attained.

When a fluid of less density is to be displaced by one of greater density, there will be, to a greater or less extent, an admixture of the two: in such a case it would be proper to give more attention to the pulverization and packing of the material.

I do not know that there is any thing of novelty in these suggestions: indeed, I suppose many, like myself, have long employed in practice the principle which they involve. I have nevertheless thought it proper to offer them for consideration.

ART. LXVIII.—FALSIFICATION OF PRECIPITATED CHALK.

BY RICHARD H. STABLER, M. D., OF ALEXANDRIA, VA.

Having my attention accidentally arrested by a fraudulent substitution for an important article which, if it prevails to any extent, may have an important bearing on the

public health ; and not remembering to have seen a notice of it in the Journal of Pharmacy or any other publication connected with our profession, I would direct attention to it.

The article referred to was purchased of a respectable house in New York (whom I believe to be ignorant of the character of it) as precipitated chalk. It was put up in boxes, 36 lbs. each, with no label or brand on the end or sides; has a gritty crystalline feel between the fingers, very different from the genuine article, decidedly saline taste, very white in appearance, exactly resembling a superior precipitated chalk ; it does not effervesce in the least, with nitre, sulphuric or muriatic acids, previously diluted ; when agitated with distilled water, allowed to subside, and the clear liquid decanted into a test glass, the nitrate of baryta gave a copious precipitate, proving conclusively, I think, that the article is pure sulphate of lime—"Plaster of Paris"—instead of Precipitated Chalk.

I send a sample of it, which thou wilt please make such use of as thee may deem best, and if the subject is of sufficient importance in thy estimation, have this letter inserted in the Journal.

Eighth mo. 1st, 1850.

[The sample under the microscope presented the characters of a crystalline powder. It may possibly have been the result of accidental carelessness in using sulphate of soda instead of carbonate of soda as the precipitant, but it is more likely to have been design, inasmuch as the manufacturer was ashamed to put his label on the packages. Such conduct should be visited by the severest reprobation of all honest apothecaries and druggists.—ED.]

ART. LXIX.—NEW PREPARATIONS OF VALERIAN.

By A. K. GARDENER, M. D., NEW YORK.

The object of this paper is to say a few words in regard to the *Radix Valerianæ*. This plant is indigenous to Europe, where it is found growing abundantly in the damp woods and meadows, as well as upon the dry and more elevated grounds. But though it is found growing naturally all over the Continent, it does not seem to arrive to such perfection as in England. And it is from thence that our supply is principally obtained. Holland produces a little, which is occasionally seen in our market. There is, however, a very marked difference in the appearance of the roots of these two varieties. The Dutch is much smaller, shrivelled and stunted in its appearance; of a much darker color, and possessing far less of the peculiar smell which characterizes this plant. It has always been considered as possessing less virtues than the English.

Within a very short time—possibly three years—a very limited supply of still a third variety, has been offered in our markets. This may be called the American. Valerian is not a native of this country, as has been stated. Its presence, therefore, deserves some explanation. Some years ago, Messrs. Brinley & Co., of Boston, imported some of the living root from England, and placed it in the hands of the Shakers at Enfield, New Hampshire. It is from this germ that the American valerian of our market is produced. Whether from the favorable character of the soil and the climate of this country, or from the care bestowed upon it, by the skilful farmers and agriculturists of this fraternity, I know not, but from either or both, has sprung up valerian far superior in its appearance to the best produced in England. Perhaps the *Valeriana officinalis* is not cultivated in England, and that the difference in its appearance may have arisen solely from the care which has been bestowed upon it. The most careless glance at the two varieties

shows a marked difference, and in favor of the American. The root is clearer, of a more yellow or brown color; the cylindrical fibres are longer, larger in circumference, and freer from knots, and presents none of the knobby, gnarled appearance which characterizes the Dutch, and is more or less observant in the English specimens. In addition to this, the aroma is far more fresh, freer from any musty additions, and in strength is allowed to be certainly as strong, if not superior to the English. So much for the sensible qualities of the American article.

In regard to the medical properties, the superiority which it is shown to possess over the English, is not more apparent than will be seen on comparing their intrinsic virtues.

Valerian is characterized as a mild stimulant, with especial direction to the nervous system, but without narcotic effect. Various diseases have been supposed to have been benefitted by this root, but its use has lately been limited to spasmodic and nervous complaints. It has been administered in powder, but used in that form it has irritated the alimentary canal. Given in infusion, a large proportion of its virtues, which consist in a volatile oil, escape. The most common form is the tincture. This preparation has been found of most uncertain value, partly from the depreciation of the root while drying—from the injury it receives in exportation, but more from the fact that the alcohol extracts other qualities, which not only render the extract less efficient, but also produces nausea, and gastric derangement. To obviate all these objections, the Messrs. Brinley have made a fluid extract from the green root, before any part of its virtues have been evaporated, and have thus been enabled to present to the profession a most valuable medicine, possessing all the virtues of all heretofore-made preparations, in an increased degree, without the qualities which detract from the value of the powder and the tincture. Having used the preparation quite extensively for

hysteria, nervousness resulting from masturbation, delirium tremens, &c., (were it necessary I could give numerous cases,) I am prepared to express my firm belief in its superiority to any form of valerian which has been before presented to the community. In this opinion I am supported by the profession generally in New England, where this preparation is in daily use, and by some of the most eminent physicians of this city.

The following is from A. A. Hayes, the State Assayer, which gives the analysis of its ingredients. Some recommendations follow, from various distinguished professors in New England.

"Oil of Valerian, as furnished by Elder Parker, May 6th, 1849. Lowell.—This oil, of a light yellow color, contains valerianic acid, and a neutral body, besides the volatile oil of valerian. After exposure to air and moisture, an interchange of the elements takes place, a crystalline body appears, while the quantity of valerianic acid is increased.

"The crystalline body appears, by the analysis of Adolph Schliesser, Esq., to be new. In its general character it resembles camphor, but differs from Borneol and Valerol, in chemical properties. Purified by solution in alcohol, and precipitated by water, it presents delicate prismatic crystals of a snowy whiteness. While cold they are nearly odorless, with a slight aromatic, very bitter taste. This substance is volatile, and when heated has the odor of valerian oil. It melts into a perfect fluid, which becomes a crystallized mass on cooling.

"The specific gravity of well-formed prismatic crystals is at 60 F. 1033 to 1055, while the solid crystalline masses are suspended in a fluid of sp. gr. of 1076. Slowly heated, fusion takes place at 198 4-10° F., to 197 7-10° F.; the transparent fluid remains, when cooled, to 195° F., but as it passes to the solid form, the thermometer marks 196 to 197 F. Below 180° the vapor rises rapidly, and condenses in frost-like, delicate, needle prisms of extreme purity. It is probable that the neutral body referred to above, is con-

nected with the production of this new camphor, but as yet experiments are wanting. Mr. Schliesser prefers to get more complete determinations, before he gives the results of the ultimate analysis he has made.

“The oil as obtained, contains all the medicinal constituents of the root, and in practice has been found to be identical with some fine samples of French manufacture. Indeed, the use of the natural fresh root for its production, insures a very perfect product, while the process is the result of the labors of all the eminent chemists who have studied the products of valerian to the present time.”

Prof. Phelps, of Dartmouth College, speaking very highly of its efficacy, says:—“In your method of preparation, the active principle is detached from the nauseating constituents of the root, and obtained in solution. We may look upon the Fluid Extract, as a solution of valerianic acid.” Prof. Cleaveland, of Brunswick College, says:—“It contains the active, medicinal principle of valerian in a *purer*, more simple and concentrated state than any other preparation of the root with which I am acquainted. Dr. Stedman, of the City Institution, Boston, says:—“In many cases where opium is inadmissible as a narcotic, anodyne, or antispasmodic, this Extract of Valerian seems to answer the indication quite perfectly.” Professors Mott and Parker, of this city, have also expressed their good opinion of this preparation. It is confessedly a simple extract, made by boiling the fresh root in pure water, with the addition of a little alcohol as a preservative. From the trial which I have given it, I am convinced that it will be found to supersede the use of assafoetida, musk, camphor, castor, &c., in a great degree. In a majority of cases I have found that from twenty drops to a teaspoonful, is an ordinary dose, repeated as often as every half hour, if necessary. In delirium tremens much more can be advantageously administered.—*Boston Med. and Surg. Journ.*, from *New York Journal of Medicine*.

[We are pleased to hear of this successful attempt at introducing the culture of valerian with a design to commerce. We have raised it in small quantities for several years past, and had arrived at the conclusion that our market could be as well supplied at home as from abroad. In reference to the soil and climate of New England proving favorable, it is what might be expected from the facts noticed by writers on its culture in Europe. We do not agree with the authors in believing *fresh* valerian to be more medicinal than the older, provided the latter is well cured at first, because the action of the air increases the amount of valerianic acid by the oxidation of the neutral volatile oil, which of itself has hardly any medicinal power. For the same reason, oil of valerian distilled from fresh root, cannot contain so large a portion of valerianic acid, as that from older root, well kept. To convince ourselves of this, we have just bruised some fresh valerian roots and compared them carefully with the best dried English valerian, bruised into a pulp with water. They are much less odorous, less acid to litmus paper, and have much less of the pungent peculiar taste of valerian. We have reason to think that the Bornein, Borneol and Valerol, are of themselves of little value medicinally, but the latter as the source of the acid by oxidation, is the means of the drug growing stronger and more valuable by age, if well cured at first, and subsequently well kept. We have no hesitation in believing that the New England drug will prove equal to the English. It is stated that the valerian grown in high situations, is more medicinal than that grown in low ground. It may be of some importance to attend to this suggestion in its culture in the United States.—EDITOR.]

ART. LXX.—CITRATE OF IRON AND MAGNESIA.

By M. VAN DER CORPUT ; with additional remarks by the Editor.

The citrate of iron and magnesia appears likely to come into general use among ferruginous preparations, being easy of administration, and not liable to produce constipation. It is prepared by dissolving two parts, by weight, of recently precipitated hydrated oxide of iron in a solution of three parts of citric acid : the liquor is then saturated with carbonate of magnesia, and evaporated to dryness. The salt is in the form of shining brown scales ; the taste is sweetish very slightly inky, and not at all disagreeable. It is perfectly soluble in water ; it is not deliquescent, so that it may be prescribed in the form of a powder. It may be prescribed in doses of 15, 30, or 60 centigrammes ($1\frac{1}{2}$, 5, or 10 grains).

Syrup of Citrate of Iron and Magnesia is prepared by dissolving 8 grammes in 15 grammes of orange-flower water, with 180 grammes of simple syrup. This is one of the most agreeable preparations of iron.

Saccharine Confection of Citrate of Iron Magnesia.

Take of Citrate of iron and magnesia	1 drachm
Powdered sugar	$7\frac{1}{2}$ drachms
Powder of canella	1 drachm

Mix, and divide into powders, each containing 12 grains.

Lozenges of Citrate of Iron and Magnesia.

Take of Citrate of iron and magnesia	$\frac{1}{2}$ drachm
Powdered sugar	$7\frac{1}{2}$ drachms
Saccharine confection of vanilla	$\frac{1}{2}$ drachm
Mucilage of tragacanth, a sufficient quantity.	

Mix and divide into lozenges of twelve grains.—*London Journal of Medicine*, April, 1850, from *Journal des Connaissances Medico-Chirurgicales*, March, 1850 and *Hays' Journal*.

[The following formula will be found more practical and will yield a product nearer the equivalent proportions than the succinct one of M. Van der Corput.

Take of Sub Carbonate of Iron (U. S. P.) three ounces.

Common Muriatic acid, half a pint, or a sufficient quantity

Citric acid, eight ounces.

Carbonate of magnesia two ounces and a half.

Solution of ammonia.

Water of each, a sufficient quantity.

Dissolve the sub-carbonate of iron in the muriatic acid, in a porcelain dish, with the assistance of heat and agitation, then filter the solution, if necessary, dilute it with four pints of water, and add the solution of ammonia until it is in slight excess—stirring meanwhile. The precipitated sesquioxide of iron is then washed thoroughly with water, first by subsidence and then on a muslin filter, and the water pressed out of it as much as possible.

Put the citric acid in a porcelain capsule, pour on it a pint of water, add the hydrated sesquioxide of iron till it is all dissolved, and then the carbonate of magnesia. When the latter is dissolved, filter the solution, evaporate it by a water bath, to a syrupy consistence, and spread it on sheets of glass with a flat varnish brush, to dry spontaneously.

The above quantity of hydrated oxide may be obtained from eight and a half ounces (troy) of sulphate of iron, by the process of the United States Pharmacopœia, but the above method, though rather more expensive, is easier for the inexperienced operator.

Citrate of iron and magnesia thus prepared is in greenish yellow scales, transparent, somewhat deliquescent, very soluble in water, insoluble in alcohol and ether, with a slightly ferruginous somewhat acid taste. It may be given in aqueous or syrupy solution, or pills.—EDITOR.]

ART. LXXI.—REMARKS ON THE PREPARATION OF HYDRARGYRUM CUM CRETA.

BY EDWARD JENNER COXE, M. D., New Orleans.

THE value of an uniformly perfect preparation of this medicine in many affections of the bowels, more particularly of infants, is too well known to require an apology for requesting the insertion of these remarks in the *Journal of Pharmacy of Philadelphia*. I am induced to make more generally known the following mode of preparing *Hydrargyrum cum Creta*, in consequence of the remarks of Mr. Procter in the April number of the *Journal of Pharmacy*, 1850, upon certain changes produced in the article, as well as in the remedial effects uniformly anticipated from its administration.

It appears that the preparation examined and commented upon was made after the formula of Dr. D. Stewart, of Baltimore, in which a certain proportion of resin was used for the purpose of facilitating and expediting the change effected by trituration, which by many is thought to consist in minuteness of comminution. The usual mode of preparing this medicine laid down in the *American Pharmacopœia*, and the *Dispensatory of Drs. Wood and Bache*, which should be the authority for all American druggists, is to triturate the proper quantities of mercury and prepared chalk in a mortar, until all the globules shall have disappeared. By some, for the purpose of facilitating the operation, it is recommended to add occasionally a small quantity of water, and by Dr. Stewart, a small quantity of resin. This having been satisfactorily proved by Mr. Procter to be improper, and the first, except at the commencement of trituration, according to my experience, retarding instead of hastening the process, I now proceed to notice that mode of preparation which must necessarily result in a perfectly uniform medicine, not to be affected by any unlooked-for chemical changes.

While engaged in the old and tedious process of tritura-

tion, without, after eight or ten days' labour, having succeeded in completely extinguishing the mercury, Mr. W. Hewson, formerly a druggist of Augusta, Georgia, happened to enter my store, and seeing our occupation, remarked that he had accidentally discovered a simple, quick, and certain mode of accomplishing the object, by putting the ingredients into a well-corked bottle, which was to be kept in constant agitation by the hand until the preparation was completed. By this mode he had found that much less time was expended than by the old one.

Obliged for the information, I lost no time in testing the plan, by putting three ounces of mercury and five ounces of prepared chalk (precipitated) in a quart bottle well corked. I decided, however, to continue the occasional trituration of that in the mortar, upon which so much time and labour had already been expended, for the purpose of instituting a comparison with that about to be made. The result was most satisfactory, as you will be enabled to judge from the sample sent. It follows, conclusively, that if with the amount of succussion expended upon this preparation, it has been made so fine as to prevent the detection of a minute globule by the aid of a glass of moderate power, a further continuance of the same would effect a still more complete comminution. It will be seen that the sample sent presents the fine grey colour attributed to it; and it may be well to state that this preparation is known by many as the Grey Powder, by which appellation I have had it called for.

I feel the more disposed to consider it important to disseminate through the Journal of Pharmacy the above simple plan of preparing a valuable medicine, from the fact that a large proportion of that imported does not possess the characteristic colour, satisfying me that such had been made by the addition of some simplifying agent; with the result of an inferior, if not an injurious, article. The process above detailed will enable all to dispense a perfect preparation, and prevent disappointment at the bedside.

Accompanying the Hydrargyrum cum Creta, I send a sample of Hydrargyrum cum Magnesia, made in the same manner, the proportions being those laid down in the Dispensatory of Drs. Wood and Bache.

It is my intention to prepare another portion of Hydrargyrum cum Creta, with a view of ascertaining whether the introduction of a few dozen small pieces of gravel would not materially hasten the preparation, by causing a more speedy breaking up of the globules; and as no deterioration could possibly result, I am disposed to regard the suggestion as an improvement.

By triturating in separate mortars a portion of each sample of Hydrargyrum cum Creta sent, with a small quantity of distilled water, I find that while in both the globules of mercury reappear, they are not so numerous or large in that made by succussion as in the other. From this, it appears to me, two facts necessarily result :

1st. That no possible advantage can accrue from the addition of any substance, other than the gain of a little time, which should never of itself be allowed to enter into consideration in the preparation of any medicine.

2d. That the perfection of the preparation depends in a great measure, if not altogether, upon the minuteness of comminution, which can be carried to an almost indefinite extent by bestowing a corresponding amount of time and labour in the succussion.

[Accompanying the above paper, we received two samples of Hydrargyrum cum Creta : one "received from one of the best importing drug houses in New York." Its colour has a reddish tinge, precisely like that described at page 113 of this Journal, and like it contains a considerable amount of red oxide of mercury. The other specimen was made by Dr. Coxe, and presented all the characteristics of a good preparation.—EDITOR.]

ART. LXXII.—THE KOSSO, OR BRAYERA ANTHELMINTICA.

BY JONATHAN PEREIRA, M. D., F. R. S.

[The following notice of Kosso is condensed from an elaborate paper, contained in the London Pharmaceutical Journal, for July, page 15.—*Editor.*]

HISTORY.—*Kosso* has been used in Abyssinia as an anthelmintic for more than two centuries. Bruce, in his '*Travels, &c.*' published in London, 1790, mentions this medicine, which he called *cusso*, and proposed to call the tree *Banksia Abyssinica*, after Sir Joseph Banks, but that name having been appropriated, it was subsequently named *Brayera anthelmintica*, by Kunth, after Dr. Brayer, a French physician who resided a considerable time at Constantinople, and who had witnessed the valuable anthelmintic properties of *kosso*, and had himself successfully employed this remedy. After his return to Paris, in 1823, Dr. B. sent some fragments of the male flowers to the Prussian botanist Kunth, who ascertained that the plant which yielded them formed a new genus, near to, but distinct from that of *Agrimonia*.

Brayera anthelmintica, the only species of the genus yet described, is a tree twenty feet in height, branches round, rusty, tomentose-villose, marked by the annular cicatrices of the fallen leaves. Leaves crowded, alternate, interruptedly, impari-pinnate, and sheathing at the base. Leaflets oblong, or elliptically lanceolate, acute, serrate, villose at the margin and on the nerves of the under surface. Stipules adnate to the petiole, which is dilated at the base and amplexicaul. Flowers diœcious, small, greenish, and becoming purple: repeatedly dichotomous; the pedicil with an ovate bract at the base. The so-called male flowers may be regarded as hermaphrodite, inasmuch as the carpels are well developed. The female flowers are somewhat different in their structure. The outer segments of the calyx are much more developed than in the female flowers, and are four or five times

larger than those of the inner row, and are placed somewhat below them; the petals are entirely wanting; the stamina are rudimentary and sterile.

The ripe fruits are unknown. The tree grows in Tigre, Agame, and Shoa, and is cultivated everywhere. Dr. Beke writes that the tree is "found throughout the entire table-land of north eastern Abyssinia, but appears to require an elevation of upwards of six thousand (perhaps seven thousand) feet for its growth. Where I found it most luxuriant, was in the vicinity of the source of the river Abai, (Bruce's Nile) at an elevation of close upon nine thousand feet. Tigre, the northern portion of Abyssinia, being, upon the whole, of lower elevation than the rest of that country, the tree is only found there in a few places."

Bruce gave a very good popular account of *kosso*, accompanied by what he justly terms a "true and exact" figure of the plant. I have compared his plant with a specimen of the plant collected in Abyssinia by Schimper, and contained in the herbarium of my friend Mr. N. B. Ward, and with the commercial flowers, and find that they are fair representations of the plant.

Bruce states that the Abyssinians evacuate once a month "a large quantity of worms; these are not the tape worm, or those that trouble children, but they are a sort of worm called ascarides." Other travellers tell us that the worms with which the Abyssinians are troubled, and for which they employ the *kosso*, is the tape worm. The accuracy of this latter statement has been tested by Dr. Hodgkin, who administered oil of turpentine to an Abyssinian in the service of Dr. Beke, and thereby expelled a *Tenia solium*, the same kind of tape worm found in England and at the Cape of Good Hope.

Mr. Johnston states that the *kosso* is gathered for medicinal purposes before the seeds are quite ripe, whilst still a number of florets yet remain unchanged. The bunches are suspended in the sun to dry, and if not required for immediate use, are deposited in a jar.

I have seen only one package of *kosso*; this was kindly opened in my presence by M. Simond of the firm of Caylits, Simond, & Co., the agents of M. Rochet d'Hericourt. It was a deal box, containing about 30 lbs. of the dried flowers, wrapped up in a large skin of red leather. On removing the lid of the box, and untying the leather package, the fragrant or balsamic odour of the dried flowers was very powerful. It appeared to me to be somewhat similar to the combined odours of tea, hops, and senna leaves. The flowers had apparently undergone no preparation beyond that of dessication. The bunches of flowers were perfect and unbroken, though of course compressed. The general colour of the dried mass was greenish yellow; but when the flowers were more closely examined, the edges of the petals were seen to have a reddish or purplish colour.

The taste of the dried flowers is at first not very marked, but after a few minutes, a feeble, senna-like, acrid, unpleasant taste becomes perceptible. By soaking the dried flowers in water, they may be unfolded sufficiently to determine their botanical character. When submitted to microscopic examination, the hairs are perceived to be simple lymphatic hairs tapering at their distal extremity.

In Abyssinia two sorts of *kosso* are distinguished, viz.: 1st, the *red kosso* produced by the female flowers; 2d, the male flowers known as *kosso esals*. In commerce the two are always mixed.

Adulteration.—Considering the enormous price (about \$8.50 per ounce) at which *kosso* has been hitherto sold in Paris, and the very limited quantity originally supplied by M. Rochet d'Hericourt, it cannot be surprising that the article should be extensively adulterated. Indeed I have been assured on creditable authority, that the powder now selling as “*kouosso*” is, in fact, the powder of pomgranate bark; and that legal proceedings are about being commenced in Paris, to put a stop to the fraud, which is well calculated to injure the reputation of the genuine Abyssinian remedy.

The surest way is to employ only the flowers, and powder them when so wanted.

Kosso has been examined by Wittstein and by Martin :—

WITTSTEIN'S ANALYSIS.				MARTIN'S ANALYSIS.	
Fatty oil,	}	-	-	1.44	Starch,
Chlorophyle,					Saccharine matter,
Wax,	-	-	-	2.02	Vegetable extractive,
Bitter, acrid resin,	-	-	-	6.25	Green odorous resin,
Tasteless resin,	-	-	-	0.77	Crystalline substance,
Sugar,	-	-	-	1.08	called <i>kwoscine</i> .
Gum,	-	-	-	7.22	
Tannin, striking a green color with iron,	-	-	-	8.94	
Tannin, striking a blue color with iron,	-	-	-	15.46	
Vegetable fibre,	-	-	-	40.97	
Ashes,	-	-	-	15.71	

The ashes consist of potash, magnesia, lime, oxide of iron, sulphuric and phosphoric acids, chlorine and silica.

With regard to the two kinds of tannin, Wiltstein observes, that as far as he knows, this is the first instance recorded of a plant containing simultaneously two kinds of tannin, striking the one a blue and the other a green, colour with the salts of iron.

Although it is not improbable that the anthelmintic property of *kosso* may in part depend on tannin (since the pomgranate bark which contains this principle in abundance, is, like *kosso*, also an anthelmintic,) yet what may be termed the peculiar property of *kosso*, probably resides chiefly in the bitter acrid resin. This is soluble in alcohol and in ether, and appears to be a neutral body, manifesting neither distinct alkaline nor acid properties.

The crystalline principle of Martin is white in silky crystals, has a styptic taste and is soluble in ether and alcohol. It reddens litmus and dissolves without decomposition in sulphuric, muriatic and nitric acids.

The dried plant evolves a fragrant odour when boiled in

water, which is done with that of the drug, probably to volatile oil of which, however, Wittstein makes no mention.

It is possible that the anthelmintic properties may depend in part on this oil, as Schimper states that in Abyssinia the fluid is considered to have lost its anthelmintic powers in the third year after its collection. In Europe, however, it retains its powers for a longer period (on account of the cooler climate?); for the flowers which have been used for all the recent experiments have been collected more than four years, and we are told in the shop bill of a Parisian pharmacist, that they will keep for an indefinite period.

Medicinal properties. Neither the botanical characters, or sensible properties, or chemical composition of Kosso leads to the suspicion that it possesses its valuable anthelmintic properties.

Our confidence in the virtues of Kosso therefore, rest entirely on experience, and the evidence on this point is very strong. All modern travellers in Abyssinia are agreed on the great success of the remedy on the natives of that country; and the experience of physicians in France, England, Germany, and Switzerland, confirms the favourable reports made by those who have seen the Kosso used in its native country.

The physiological effects of Kosso, are in general, not very great. Sometimes it excites a slight sensation of heat, nausea, or even vomiting, creates thirst, and frequently, perhaps usually, a gentle action on the bowels. But the latter is commonly so slight, that in a considerable number of cases, it is necessary to follow its administration by a mild purgative. It is obvious therefore, that the efficacy of kosso as an anthelmintic, does not depend on its purgative or evacuant influence, but on its poisonous or toxic action on the worm; in fact it is a true *vermicide*. In one case, that of a woman in France, it brought away ten worms, of which only one manifested evidences of vitality, and that only for a few minutes.

Kosso appears to be an effective anthelmintic in both kinds of tape worm, viz: *Tænia solium* and *Bothriocephalus latus*.

The dealers in kosso assert, that one dose will effectually cure a radical case of tape worm, which is obviously an error, because, admitting it destroys all the worms in the alimentary canal, they may reoccur, provided the patient retains his predisposition. It certainly does not radically cure the Abyssinians, since, as several writers tell us, they resort to this remedy monthly. Schimper, the governor of Adoa, says it does not completely expel the *tænia*, or at least rarely does. But he adds, that in Europeans, who are less disposed to worms, it may act in a more complete manner. In the Abyssinians this verminous disposition is innate, and is dependent on the regimen they adopt.

Hitherto the great drawback to the use of kosso has been its enormous cost. M. Rochet d'Hericourt is the sole holder, and is said to have 1400 pounds, valued by him at a guinea per ounce, equal to 112,000 dollars !!! As it can be procured in Egypt from caravans coming down the valley of the Nile, its price, which in Abyssinia is moderate, should be greatly reduced.

Administration. Both Bruce and Schimper state that the Abyssinians take a handful of the dried flowers as a dose. In Paris the dose has varied from four to six drachms. In general, however, half an ounce (troy) is considered a dose for an adult. The dose for children is as follows:—From 7 to 12 years 160 grains,—from 3 to 7 years, 120 grains; not exceeding three years, 80 grains.

The kosso should be taken in the morning fasting. The only preparation necessary is, that the last meal of the previous evening should be slight. The evacuation of the bowels by a mild purgative or a clyster, is desirable.

The mode of administering the remedy is as follows: The powdered flowers are to be mixed with lukewarm water, (for an adult, about ten ounces,) and allowed to infuse for about a quarter of an hour. A little lemon juice is then to

be swallowed, and the infusion being stirred up, the whole is taken, liquid and powder, at two or three draughts, at short intervals, being washed down by cold water and lemon juice. To promote the operation, tea (with sugar or milk) may be taken. In three or four hours if the remedy has not operated, a dose of castor oil or a saline purgative should be administered.

ART. LXXIII.—ON THE INFLUENCE OF ROSIN IN PREVENTING THE OXIDATION OF FATTY SUBSTANCES.

BY PROF. OLMSTEAD.

ECONOMIC SCIENCE.—The report in the New York *Herald* of the proceedings of the American Scientific Convention, now in session at New Haven, embraces some remarks by Prof. Olmstead, on the subject of mixing lard and rosin together, which, notwithstanding its homely sound, will be found of no little novelty and practical interest. Prof. O. accidentally observed that rosin added to lard, gives it a degree of *fluidity* not before possessed by the lard, and also prevented the latter forming those acids which corrode metals, copper and brass for example. We extract the following account of some of the properties and applications of the mixture:

The best proportions are by weight---lard three parts, rosin one part. If the rosin be added in fine powder, and the mixture well stirred, (without the application of heat,) it softens and so nearly approaches a fluid, as to run freely when taken up on the stirring-rod, at a temperature of 72 degrees. On melting the mixture, and setting it aside to cool, the following changes take place:—at 90 degrees it remains transparent and limpid; at 87 degrees, a pellicle begins to form on the surface, and soon after it begins to grow slightly viscid, and as the temperature descends, it

passes through different degrees of viscosity, like oils of different qualities, until at 76 degrees it becomes a dense semi-fluid. It is an unexpected result, that the addition of one part in four of rosin, whose melting point is near 300 degrees to lard, whose melting point is at 97 degrees, should render it more fluid, reducing its melting point to 90 degrees, imparting to it the properties of a semi-fluid, at a temperature as low as 76 degrees, and even rendering the preparation of a softer consistency than lard itself, at a temperature as low as 60 degrees. This compound of lard and rosin has, therefore, two somewhat remarkable properties:—

1. It prevents in the lard, and probably in all the animal oils and fats, their tendency to generate an acid, and thus to undergo spontaneous decomposition. A much smaller proportion of rosin than one-fourth, gives to lard this property, destroying, as it does, the tendency of these substances to oxidation. Several important practical applications result from this property. Its use for lubricating surfaces of brass or copper has already been adverted to. It is equally applicable to surfaces of sheet iron. I have found a very thin coating, applied with a brush, sufficient to preserve Russia iron stoves and grates from rusting during summer, even in damp situations. I usually add to it a portion of black lead, and this preparation, when applied with a brush, in the thinnest possible film, will be found a complete protection to sheet iron stoves and pipes. The same property renders the compound of lard and rosin a valuable ingredient in the composition of shaving soap. The quality of shaving soap is greatly improved by a larger proportion of oil than is usually employed, so as completely to saturate the alkali; but such soap easily becomes rancid when wet with water, and suffered to remain damp, as it commonly is when in use. If a certain proportion of this compound is added to common Windsor soap, (say one-half its weight) the tendency to grow rancid is prevented. A very soft and agreeable shaving compound, or "cream," may be made by steaming in a close

cup a cake of any common shaving soap, so as to reduce it to a soft consistence, and then mixing intimately with it half its weight of our resinous preparation, adding a few drops of some odoriferous substance. The same compound forms an excellent water proof paste for leather. Boots, when treated with it, will soon afterwards take the usual polish when blacked, and the soles may be saturated with it, without danger of soiling the floor, as it does not rub off, while the leather is rendered, in a high degree, impervious to water. The perfect solution into which rosin passes when heated with oil, suggested the possibility of improving in this way, the quality of oils used for illumination, and by its reducing the melting point of lard, to render that more suitable for burning in solar lamps. I therefore, added powdered rosin to lard oil, in the proportion of eight ounces of rosin to one gallon of oil, and applied a moderate heat, sufficient to produce perfect solution. I then filled two solar lamps, equal in all respects—the one with lard oil, the other with the same, holding the rosin in solution, and regulating the flames so as to be as nearly of the same size as possible. I measured by the method of shadows, the comparative intensities of light, which I found to be as 7 to 5 in favor of the prepared oil. This burned with a flame of peculiar richness, plainly exceeding in density that from the simple oil; but after two hours the flame of the prepared oil began to decline slowly, and soon became inferior to the other, an effect which doubtless arose from the clogging of the wick. I had hoped, on account of the perfect solution which the rosin seemed to undergo, that the compound would burn freely without encountering this impediment; but in this respect I was disappointed, and can only say that if some means can be devised for avoiding the tendency to clog the wick, the addition of a small portion of rosin to lamp oil or lard, will add essentially to its value for burning in solar lamps, by rendering it less liable to congeal, and by increasing its illuminating power.

[The property of *rosin* to prevent the oxidation of fatty matter, has long been observed by apothecaries in reference to resin cerate; but so far as we know, the fact has never been applied in the manner recommended by Prof. Olmstead. It has frequently been observed, in refitting ship medicine chests after long voyages, that the resin cerate remained free from rancidity, whilst all the other ointments were greatly deteriorated. The action of Benzoin and poplar buds in preventing lard and ointments in general from becoming rancid, as recommended by Deschamps, (American Jour. Pharm., Vol. xv. page 260,) is probably referable to a similar cause.—EDITOR.]

ART. LXXIV.—NOTES ON THE PURIFICATION AND PROPERTIES OF CHLOROFORM.*

BY WILLIAM GREGORY, M. D.,

Professor of Chemistry in the University of Edinburgh †

1. Chloroform has been prepared both from alcohol and wood-spirit. The latter has been used for the sake of cheapness; but as it is a mixture of several liquids, all of which do not yield chloroform, it gives an impure product, in a proportion which varies much, but is always below that obtained from alcohol. There is therefore not only no advantage, but the contrary, in using wood-spirit, which is not after all, much cheaper than alcohol.

2. But the chloroform from these two liquids, *when fully*

* Although I am alone responsible for the opinions contained in this paper, it is my duty to state, that all the experiments and observations mentioned in it have been made by me in concert with my able assistant, Mr. Alexander Kemp, of whose ingenuity and accuracy I have had constant opportunities of judging.

† Read before the Royal Society of Edinburgh, March, 1850.

purified, is quite identical in all its properties. Its smell, density, boiling-point, and action in the system, are in both cases exactly the same. That from alcohol is no doubt more easily purified than the other, but it also contains certain volatile oily impurities, which must be removed before it can be safely used. The peculiar oils which adhere to both kinds of chloroform are not identical, or at least, not all identical, but they are of analogous constitution and properties.

3. Soubeiran and Mialhe have examined these oils. They contain chlorine, have a disagreeable smell, and when inspired or smelt cause distressing headache and sickness. In the case of wood-spirit, some of its own impurities distil over unchanged, and are also found in the chloroform.

4. It is well known that many persons, after the use of chloroform, have suffered from headache, nausea, and even vomiting, as I have more than once seen. Headache and nausea I have myself often experienced, when I have tried different specimens of chloroform, without taking so much as to produce the full effect.

5. Perfectly pure chloroform does not, so far as I have seen or experienced, produce these disagreeable effects. It is therefore highly probable that when they occur, as they do with some individuals, from the use of chloroform of more than the average goodness of quality, they depend on the presence of a trace of these poisonous oils.

6. All good manufacturers of chloroform purify it by the action of oil of vitriol, which destroys the oils, while at the same time a part of the acid is reduced to sulphurous acid. The chloroform, to remove this, is then distilled with lime or carbonate of baryta, and is tolerably pure if the process be well conducted.

7. But it is not quite pure, and contains a trace, more or less distinct, of the oils. I have found this to be the case with all the best chloroform made here up to 1849; and I have several times seen headache and sickness from the use

of such chloroform, which was the best anywhere made. I must add, however, that the quantity of oils in the chloroform of the best Edinburgh manufacturers although variable within certain limits, was always so small, that that product was fit for use, and only caused headache, &c., in a few peculiarly sensitive persons.

8. It was desirable to have a test for these impurities, as well as an easy and effectual mode of removing the last traces of them, especially as many sorts of chloroform not made here were far inferior in quality to that prepared in Edinburgh. One very delicate test is, that of oil of vitriol, which should be quite colourless, pure, and of the full density of 1.840 at least, as it may be obtained by Mr. Kemp's process, lately read to the Royal Society; when agitated with the chloroform, it becomes yellow or brown, from its action on the oils, which it chars and destroys. Any change of colour is easily seen by contrast with the colourless chloroform which floats above. Pure chloroform gives no colour to the acid. It is essential that the oil of vitriol be colourless and also of full density; for if coloured, it is not easy to see a slight change on its colour; and if below the proper density, that is too weak, it is not much coloured by a chloroform which will render dark brown the acid of proper strength.

9. Another test, still more delicate, I find to be the smell of the oils. When chloroform is poured on the hand or on a handkerchief, it rapidly evaporates; but the oils being less volatile, are left behind; and their smell, previously covered by that of the chloroform, is easily recognised. Until very lately no chloroform was sold, or indeed known, which would stand this test, or even the former.

10. Up to 1849 the best commercial chloroform had a specific gravity of 1.480, which was considered a guarantee of its purity; but it had been obtained by chemists of specific gravity 1.494, and even 1.497. I have found that chloroform of 1.480, when once more acted on by oil of vitriol,

which destroys the oils and becomes brown, may be obtained after removing the sulphurous acid, of specific gravity 1.500 at 60°. This I take to be the specific gravity of pure chloroform. Our best makers have lately, much to their credit, pushed the purification so far as to furnish chloroform even of this highest density, and also in other respects such as it ought to be.

11. There are still, however, many makers in other places whose chloroform is not so pure; and I shall now describe the method which, with Mr. Kemp, I have employed for purifying, perfectly and easily, any commercial chloroform, except one remarkable specimen—a process which will enable any medical man to purify it for himself with the greatest facility.

12. The chloroform, having been tested as above, and found more or less impure, is to be agitated with the oil of vitriol, (half its volume will be sufficient,) and *allowed to remain in contact* with the acid, of course in a clean, dry, and stoppered bottle, and with *occasional agitation* till the acid no longer becomes darker in colour. As long as the action is incomplete, there will be seen, after rest, at the line of contact, a darker ring. When this no longer appears, the chloroform may be drawn off, and for greater security once more acted upon by a quarter of its volume of the acid, which should now remain colourless. It is now to be once more drawn off, and in a dry stoppered bottle mixed with a little powdered peroxide of manganese, with which it is gently agitated, and left in contact until the odour of sulphurous acid is entirely destroyed, and the chloroform has acquired a mild, agreeable, fruity smell. It has then only to be poured off into a proper phial. It will now leave no disagreeable smell when evaporated on the hand. [If the commercial chloroform, after having been *frequently well shaken* and *left for some time in contact* with the acid, has given to it only a moderate tinge of colour, it is probable that it may be completely purified by the first

process. To ascertain this, test a fresh portion in a tube with fresh acid, shaking well and allowing it to stand for some time. If it do not colour the acid at all, then the whole chloroform has only to be finally purified by the oxide of manganese. If the acid become coloured in the test-tube, it will be as well to act on the whole chloroform a second time with fresh acid till it stands the test. Mr. Kemp has observed, in repeating this process for me, the very curious fact that, as soon as the action is complete, and the oily impurities are destroyed, but not sooner, the chloroform tested with the acid in a tube, exhibits a strongly convex surface downwards, where it rests on the pure acid, or what is the same thing, the acid becomes concave at its upper surface. The smallest trace of impurity, not sufficient to affect the density of the chloroform, we have found to render the line of junction horizontal. It is probable that this may become a valuable test of the perfect purity of chloroform; but we shall not say more on this subject until we have thoroughly examined it.] This process requires no apparatus beyond a few stoppered bottles and a *pipette*, if we wish to draw off the whole chloroform without loss, although nearly the whole may be simply poured off. The use of the oxide of manganese is due to Mr. Kemp; and on the large scale the chloroform may be filtered through a cylinder full of it. In this final purification of commercial chloroform, no distillation is necessary. Indeed, no rectification is required at all, if it be well washed with water before using the acid.

13. It may be considered as certain, that the use of chloroform thus purified will very rarely, if ever, cause the disagreeable effects above noticed.* As to more serious bad

* Dr. Simpson informs me, that the purest chloroform he has used not unfrequently causes vomiting. On further inquiries, I find that this occurs when it is administered after a full meal. This can easily be avoided, and must not be confounded with the headache, nausea and vomiting alluded to in sections

results from the use of chloroform, so often spoken of elsewhere, it is enough to state that a large proportion of the cases must be attributed to the use of a liquid so impure as hardly to deserve the name of chloroform at all.

Postscript.—Since writing the above, my attention has been called to a paper by Dr. Wilson, on the specific gravity of chloroform, which he was not able to obtain higher than 1.498. I have therefore to add, that every specimen, whether of specific gravity 1.480, 1.490, or 1.497, which I purified as above, acquired the same density of 1.500, as ascertained by the use of a very delicate and accurate bead, (made by Lovi,) which sank at $60.^\circ 5$ and rose at $59.^\circ 5$; and also by three successive weighings with a very delicate balance. It will also be seen, that three commercial specimens had

4 and 5, which symptoms are persistent, and occurred in my experiments always with an empty stomach, the experiments being made an hour or two before dinner. Mr. Carmichael, assistant to Dr. Simpson, has mentioned to me some facts which confirm the view I have taken. At one period, for more than a week, Dr. Simpson and Mr. Carmichael were kept in a state of continual anxiety by the occurrence, in all the puerperal cases in which chloroform was used, of very unpleasant symptoms, particularly of frequent pulse and other febrile symptoms, lasting for some days. At last, after much annoyance from this cause, it occurred to Dr. Simpson that he was using one particular specimen of chloroform above the average in quality. As soon as this idea occurred, he threw away all that remained, and returned to that which he had generally used. The unpleasant symptoms no longer appeared. [I regret much that I had not an opportunity of examining that specimen; but I may add, that the maker, not an Edinburgh one, now produces chloroform of much better quality, though not yet absolutely pure.] But the striking fact is this, that Dr. Simpson and Mr. Carmichael state, that during the period above alluded to, when that one kind of chloroform alone was used by them, their handkerchiefs became quite offensive from the smell left on them, which even adhered to them after washing. There can, I think, be no doubt, that here the oily impurities alluded to in sections 4 and 5 were present in notable quantity.

this density; I could detect no foreign matter in my chloroform; and besides, every foreign matter that is likely to occur *lowers* the density. I have no doubt that Dr. Wilson's specimens would have colored the acid and left a smell on the hand.

I may add, for the maker, that, after distilling the materials which yield chloroform, no distillation or rectification is needed. He has only to wash the heavy fluid with water till its volume no longer diminishes, and then to use the oil of vitriol as above, finishing with the oxide of manganese. Distillation with the acid is of no use, because no proper contact can take place, the chloroform distilling from the surface as it would from mercury. In testing by oil of vitriol, it is best to use some ounces of chloroform, and to shake it in a phial, because in a test-tube, the color produced, if not strong, may be overlooked.

While I acquit the makers of chloroform, who have sold an impure drug, of all desire or intention to adulterate it, I feel it my duty to point out, that the system which permits *any one* to set up as a manufacturer of this or any other potent remedy, without let or hindrance, without any test of his qualifications, without, in short, enforcing a knowledge of chemistry and pharmacy as an essential condition, is a radically bad one; and that our law, in relation to Druggists and Apothecaries, requires reformation. In fact, the evils naturally resulting from it are only neutralized, and that but in part, by the good feeling and principle of the leading manufacturers.

To illustrate this, I may remark, that some of the makers of chloroform must have been very ignorant, even of what was known and published concerning its properties; for, among the specimens I examined, are several of specific gravity below 1.480, which was long ago given as the standard, even so low as 1.347.

That this neglect proceeded more from ignorance than from intention, is, I think, plain from the fact, that a speci-

men labelled "Pure Chloroform" actually contained only a trace, about one-thirtieth, of that substance. I did not ascertain its specific gravity, which must have been far lower than 1.200 or 1.100—nay, possibly, under 1.000, because its impurity was so obvious in every other respect, and the quantity I had was too small; but, on examining it further, I am convinced that its origin was this:—The maker, after distilling the materials, obtained, of course, two liquids, a lighter and a heavier. He evidently *did not know* that the latter was the chloroform, and therefore threw it away, and preserved the *lighter*—a mixture of pyroxilic spirit—of its natural impurities, of the deleterious chlorinated oils and a *trace* of chloroform. At least, such are its characters; and it exactly resembles what would be obtained in the way supposed. But what a fearful degree of ignorance (without any evil intention) is here exhibited! And yet this maker was free to produce and sell *pure chloroform*, which was actually almost *pure from chloroform*, and loaded with deleterious agents.—*Monthly Journal of Medical Science*, May, 1850, and *Pharm. Journ.* June 1850.

[A few weeks since, having occasion for some chloroform, we obtained a pound from a manufacturing establishment in this city. On opening the bottle, the odor of the chloroform was contaminated with that of chlorine, and the stopper had on it a greenish yellow discoloration. On returning it to the chemist with the information of its impurity, we received the following note :

"Dear sir: We have your favor of this morning, in regard to chlorine found in chloroform, and for the same are much obliged, as it gives us some ground, other than our own opinion, for declining to make the article by the late improved process with sulphuric acid. We soon discovered that this change was likely to go on, but some of our customers wanting an article of this kind (*i. e.* made by this process) particularly, we were induced to adopt the improvement."

This chloroform bleached moist litmus paper rapidly, first

reddening it. The acidity is due to hydrochloric acid, generated from the chlorine and moisture adhering to the chloroform operated on by light. Mr. Abraham, in the paper, at page 348, has arrived at similar conclusions.—EDITOR.]

ART. LXXV.—CLIMATE OF AUSTRALIA.

BY JOHN GOULD, Esq., F. R. S., F. G. S., &c.

In a country of so vast extent as Australia, spreading over so many degrees of latitude, we might naturally expect to find much diversity in the climate, and such is really the case. Van Diemen's, from its isolated and more southern position, is cooler, and characterized by greater humidity than Australia; its vegetation is therefore abundant and its forests dense and difficult of access. The climate of the continent, on the other hand, between the 25th and 35th degrees of latitude, is much drier, and has a temperature which is probably higher than that of any other part of the world, the thermometer frequently rising to 110, 120 and even 130 deg. in the shade; and this high temperature is not unfrequently increased by the hot winds which sweep over the country from the northward, and which indicate most strongly the parched and sterile nature of the interior. Unlike other hot countries, this great heat and dryness is "unaccompanied by night-dews, and the falls of rain being uncertain and irregular, droughts of many months' duration sometimes occur, during which the rivers and lagoons are dried up, the land becomes a parched waste, vegetation is burnt up, and famine spreads destruction on every side. It is easier for the imagination to conceive than the pen to depict, the horrors of so dreadful a visitation. The indigenous animals and birds retire to the mountains, or to more distant regions exempt from its influence. Thousands of sheep and oxen perish, bullocks are seen dead by the roadside, or in the dried-up water holes

to which, in the hope of relief, they had dragged themselves, there to fall and die; trees are cut down for the sake of the twigs as fodder; the flocks are driven to the mountains, in the hope that water may there be found, and every effort is made to avert the impending ruin; but in spite of all that can be done, the loss is extreme. At length a change takes place, rain falls abundantly, and the plains, on which, but lately, not a blade of herbage was to be seen, and over which the stillness of desolation reigned, become free with luxuriant vegetation. *Orchideæ*, and thousands of flowers of the loveliest hues are profusely spread around, as if nature rejoiced in her renovation, and the grain springing up vigorously, gives promise of an abundant harvest. This change from sterility to abundance, in the vegetable world, is accompanied by a correspondent increase of animal life; the waters become stocked with fish, and the marshy districts with frogs and other reptiles, hosts of caterpillars and other insects make their appearance, and, spreading over the surface of the country, commence the work of devastation, which, however, is speedily checked by the birds of various kinds that follow in their train. Attracted by the abundance of food, hawks, of three or four species, in flocks of hundreds, depart from their usual solitary habits, become gregarious and busy at the feast, and thousands of Ibises (*Ibis spinicollis*) and other species of the feathered race, revel in the profusion of a welcome banquet. It must not, however, be imagined that this change is effected without its attendant horrors; the heavy rains often filling the river beds so suddenly that the onward-pouring flood carries with it every thing that may impede its course, and woe to the unhappy settler whose house or grounds may lie within the influence of the overwhelming floods!

So little has as yet been ascertained respecting the climatology of Western, North-Western, and Northern Australia, that it is not known whether they also are subject to these tremendous visitations; but as we have reason to believe

that the intertropical parts of the country are favored with a more constant supply of rain, as well as lower degree temperature, it is probable that they do not occur.

American Journal of Science and Arts, July 1850.

ART. LXXVI.—ON A DIRECT METHOD OF OBTAINING IODINE FROM CERTAIN SPECIES OF SEA-WEED ON THE LARGE SCALE, WITH A MODE OF PROCURING IT AS A SUBSIDIARY PRODUCT ADAPTED TO COAST FARMS.

BY GEORGE KEMP, M. D.,

Cantab., Fellow of the Cambridge Philosophical Society.

The following paper contains the summary of a research on the above subject, made on the Isle of Man, at intervals, during the year 1847, 1848, and 1849; and, although distinguished by many district features, the principles involved are equally applicable to all localities similarly circumstanced. As a preliminary step, it may not be improper to remind the reader, that on all sea-coasts the marine vegetables may be classified according to the depths at which they are found; and for our present purpose it will merely be necessary to include them under two general classes, the shallow and deep water sea-weeds; the former of these embracing such growths as flourish between high and low water-marks, and the latter such as are only, or principally, found from low water-mark to the depth of three or four fathoms. We instance the *Fucus vesiculosus*, *F. serratus*, *F. nodosus* and *Halydrys siliquosa* as specimens of the first of these divisions; whilst the *Laminaria digitata*, *L. saccharina* and *L. bulbosa* will be sufficiently illustrative of the second, and have indeed furnished the principal materials for the investigation on which we are about to enter. It may further be premised, that nature, equally provident and fertile in her resources, seems to have destined these

marine productions to act as her storehouses for the accumulation of certain inorganic bodies, essential to terrestrial vegetation, and which, but for this provident care, would rapidly be out of human reach. In the Isle of Man this economical arrangement is peculiarly necessary. The more soluble portions of the granite, felspar, clay-schist, &c., which by attrition and solution are rapidly conveyed to the sea, are thus again presented to the agriculturist, and that in a condition admirably adapted for assimilation by the organs of plants; without this wise provision, he would be principally dependent for alkaline salts on masses of hard intractable rocks, the mechanical state of which would naturally form an almost insuperable barrier to the process of absorption. Referring to the excellent work of the Rev. J. G. Cumming for information on the geology and localities of the island, we now proceed to the principal chemical features of the two classes of sea-weed to which we have alluded; and it may be stated, as the general result of analysis, that the metallic base preponderating in the Fuci is sodium,* combined with oxysulphion, chlorine, and small quantities of iodine and bromine; whilst the plants which flourish in what Prof. E. Forbes has denominated the laminarian region are characterized by containing a preponderating quantity of potassium, with a far larger proportion of iodine than in the former species, and are on this account therefore of more interest and importance to the manufacturer. Many practical difficulties however prevent the maximum advantage to be derived from the above facts in a manufacturing point of view; and, in order to obviate them as much as possible, the writer was induced, at the commencement of his research, to apply to the Commissioners

*Prof. Thompson states, on the authority of Gaultier de Claubry, that the *Fucus serratus* contains more iodine than *F. digitatus* or *vesiculosus*. The experience of the author is directly the reverse, presuming that the *F. digitatus* is identical with what is now denominated *Laminaria digitata*.

of Woods and Forests for permission to cut the seaweed from the rocks, the preliminary object being to make comparative experiments on the particular period of growth at which these marine productions contain the largest amount of the element in question. Various circumstances, however, partly local, partly arising out of the nature of the case, rendered this formality unnecessary; it was, in fact, soon determined, that, in the earlier periods of growth, iodine is almost absent, progressing however with the advance of the plant, and at the maximum, at the precise period when the weed yields to the autumn tempests and is drifted on the shore, thus saving all the additional expense and risk of collecting from the rocks. Assuming then that two main points are established, viz. that the most fertile source of iodine is in the laminarian species, and in them at the period when their perennial functions are completed, we may allude to the present mode of obtaining the element from the ashes of the plant, which we shall designate the kelp process, and show how the assumed facts influence the operations of the manufacturer, or rather the impossibility of obtaining the maximum advantage derivable from a proper application of these facts, with the present mode of extracting iodine by the kelp process. All sea-weed contains a very large proportion of sea-water; in the small shallow-water species this can be removed, by exposure in summer to the wind and sun, without great difficulty; in the other species, on the contrary, even under the most favorable circumstances, decomposition will occur before the plant can be brought into a condition favorable for its combustion; the consequence is, that the kelp process is principally confined to a species which contains but a small portion of iodine, and to a period of the year at which the other species has not arrived at maturity. The disadvantage does not rest here. The temperature, in forming kelp, cannot be so nicely controlled as to prevent the more volatile iodides being dissipated, or, what is of still more fre-

quent occurrence, being lost by mechanical agency, a very brisk current of hot air being set in motion by the very nature of the operation, accompanied as it usually is by a slight breeze. But another important point remains to be considered, which is indeed almost prohibitive of obtaining kelp rich in iodine in districts thickly inhabited. The smoke arising from the combustion of the *Laminaria digitata* particularly, is most offensive; and, unless the wind is blowing off shore, the burning the weed on the large scale would be prohibited, or the party who undertakes the process be constantly engaged in law proceedings; and as the laws in the Isle of Man are either peculiar or peculiarly administered, no reasonable prospect could be entertained of ultimate success. All these circumstances, taken collectively, induced the writer to seek out a method by which these evils might be obviated; and in doing so it became necessary to determine in what portion of the plant the element sought after is contained in greatest abundance, and whether it would not be practicable by mechanical means to arrive at the desired result. Excluding then for the future the shallow-water species, we confine our remarks to the modes pursued with reference to the *Laminaria digitata* and *L. saccharina*, principally indeed to the first, as it not only presented the greater difficulty, but also was furnished in greater abundance.

On making then a transverse section of the stem of the *L. digitata*, we observe externally a thin cortical layer, next a mass of condensed cellular tissue, and internally a transparent medullary central portion, generally of an elliptical form. Applying to one of these surfaces a weak solution either of acetic or hydrochloric acid, we cover it with a very slight layer of starch-paste, and cautiously expose it to the action of chlorine, from the mouth of a bottle containing a solution of that gas. The iodine being set free, and rendering its presence perceptible, through combination with amydon, will be immediately proved to be enveloped

in cells between the external cortical and central medullary portions. An important step has now been made in the investigation, and hopes were at first entertained that the object sought after would at once be arrived at, by exposing the stem of the plant to pressure, and from the liquid obtained, which it was presumed would contain the greater portion of iodides in solution, without further trouble liberating the iodine itself. Great physical difficulties however presented themselves; and so condensed was the cellular tissue found, that on exposing a portion, not exceeding the dimensions of a cubic inch, to the pressure of a ton weight, but a very small portion of fluid was obtained, although Professor Forchhammer* estimates this at 75 per cent., a quantity far less than has been found at different times by my friend Mr. Waldie of Liverpool, and myself. It was determined, therefore, in the next experiment, to break up the cellular tissue as completely as possible, by rubbing the stem on an ordinary domestic grater. The result was perfectly satisfactory, and the iodine liberated, by ordinary chemical operations, with the greatest ease; but it was necessary to modify the plan, so as to adapt it for application on a large scale. A turnip-cutter was therefore furnished with a small band-wheel of 6 inches in diameter, and this connected by means of a band with a wheel 5 feet in diameter, which in working was caused to revolve eighty times per minute, thus communicating to the smaller wheel a velocity of 800 revolutions per minute; and the machine being supplied with the stem divested of roots and terminal leaves it was cut into small slices with great rapidity. The original intention was to pass these slices through another

* "At the point of Kronborg, near Elsingor, about 30,000 two-horse loads of sea-weed are annually thrown on shore in the months of November and December, which, calculated at 500 lbs. dry plants each, are equal to 15 millions of pounds."—Forchhammer *on the Metamorphosed Fucoid Schists in Scandinavia; Report of British Association for 1844*, p. 163.

machine, prepared for the purpose, which would have reduced these slices to a pulp, thus effectually breaking up the cellular tissue, and then proceeding to express the fluid and liberate the iodine as in the type experiment. Nature however interposed to save the trouble, for the mass of slices having been left in a heap for about twelve hours, a species of fermentation commenced, with evolution of heat and other phenomena, which reduced the whole mass to a pulp without further trouble; and this mass being submitted to adequate pressure, completed the object in view. The fibrous tissue left in the press still contains iodine; but the pressed mass is so easily charred at a low temperature, that on a large scale this method will no doubt be preferred to the more circuitous course.

With reference to the *Laminaria saccharina*, which in the autumn is very rich in iodine, the plan of extraction is still simpler. Having collected this, as drift-weed, it is only necessary to heap it up in vats, or other receptacles of adequate size, with a tap at the bottom to allow the liquid to escape. For some hours nothing but sea-water runs off; at a certain stage, however, and time, mainly dependent upon quantity and temperature, active fermentation sets in; and as it is presumed that the liquid running off is carefully tested for iodine from time to time, immediately its appearance is indicated the tap should be closed, and during the next twelve hours the contents of the vat should be occasionally moved or stirred about. When the contents have been reduced to a soft pultaceous magma, in which all remaining cellular tissue can be readily broken down by the hand, the addition of quicklime in sufficient quantities, which will vary with the amount of substance operated upon, but may easily be determined by experience, completes the process; and in this case almost the whole of the iodides in solution may be removed by expression. In localities where lime is expensive, the process of charring may be resorted to.

The subsequent steps of the operation will be much influenced by circumstances. If the object be merely to save the iodine, a variety of methods may be adopted to effect this purpose, one of which will be mentioned in the sequel; if, on the other hand, it be a consideration to obtain the potash salts, evaporation and probably repeated crystallizations, must be resorted to; and the facility of obtaining fuel at a little expense will of course become an important element for consideration. It will however at once occur, that the cellular tissue which remains after pressure will render important service in this case; at all events, but little experience and ingenuity will be called into requisition for combining all the favorable circumstances in such a manner as to insure a profitable arrangement. Whilst the use of iodine remains a matter of importance only in a pharmaceutical point of view, the demand must necessarily be limited; and such a supply as could easily be obtained by the above method would materially affect the market; but should any means be discovered of rendering it adapted to the purposes of dyeing, the application of sufficient capital would doubtless be attended with very profitable results.

Another case presents itself, in which a modification of the above plan, carried out on a limited scale, may be of extensive practical benefit. On all coasts similarly circumstanced with that to which we more especially allude, numerous creeks occur, which for the most part either belong to farms in their immediate neighborhood, or do so virtually, as access to them can only be obtained by a right of way through such farms; in these, immense quantities of drift-weed accumulate after every storm, which in many cases are entirely wasted, and in many others have to be conveyed to the land by roads almost impassable. Now it will be seen in the sequel, that, by a little attention, the agriculturists may convert these natural disadvantages into sources of profit; on the one hand, eliminating an impor-

tant element, which under ordinary circumstances is entirely lost; on the other, reducing all that is valuable for farm purposes into a concentrated form, admitting of transit with great economy of labor and expense. Taking Professor Forchhammer's estimate, that each ton of sea-weed is reduced by drying to 500 lbs. of solid matter (and, so far as the writer's experience is concerned, this estimate is far above the mark,) in every ton of *wrack* conveyed to the land, the farmer actually carts away, and that sometimes for miles, 1740 lbs. of water, which is all but lost labor, his object being merely to supply his land with the salts of potash and soda. By pursuing the following method, not only may a large saving be effected, but in many small holdings intelligence and industry may, from the sea-weed alone, secure a greater return than the whole produce of the farm taken collectively. It is now the writer's object to project a plan for the accomplishment of this result; but it will be previously necessary to make a slight digression.

The mutual reaction of free iodine and starch is well known; but little attention has hitherto been bestowed on the circumstance, that the facility with which iodine is precipitated from its solutions by means of starch varies exceedingly. The object of the writer being to fall on some plan, involving little expense and chemical knowledge, to effect the complete precipitation of free iodine from its solutions, he was led to the more minute investigation of the subject in detail; and, in the first place, it was found out, that the facility with which the iodide of amylo-n was precipitated depends in a great measure on the size of the starch-granule. This would lead one to suppose that the vesicular covering of the granule is the substance which more immediately combines with the iodine, or that the solution of iodine enters the vesicle by means of endosmosis; in either case the practical result will be the same. Now, according to Raspail's observations, the granule of millet

starch is only 1-1000th, that of wheat 1-500th, whilst that of the potato 1-200th of an inch in diameter. By taking advantage of this observation, even considering it as a mere approximation (for the granules of the same species vary exceedingly in size,) the facility of precipitation is much increased, favored as we are by the additional circumstance, that this is the very species of starch which may be obtained at the least, and in fact almost nominal cost. But, further, by adding a solution of ammonia to a solution of the neutral acetate of lead, we obtain, as is well known, the tribasic acetate of lead, $\text{PbO}(\text{C}^4\text{H}^3\text{O}^3)+2\text{PbO}$. By adding a solution of this compound to starch, we form an insoluble compound of starch with oxide of lead; and by making use of this substance, which can be obtained with great facility and at a trifling expense, we can in a few seconds precipitate any quantity of iodine from a solution; by taking advantage also of the weight and denseness of the precipitate, we can decant the supernatant liquid, and, if necessary, repeatedly wash the precipitate without loss. A few precautions will still better adapt the above plan to the end designed, and facilitate manipulations considerably. Let the potato-starch be formed as usual, by grating and washing, and then strained through a sieve or coarse linen, to separate it from the broken-down cellular tissue; the turbid liquid should now be allowed to repose for a few minutes, and the supernatant milky fluid be poured off; the residuum is again washed, and treated in the same manner, until the precipitate subsides rapidly, and the liquid clears in a few seconds; the smaller granules are thus removed. Having previously prepared a strong solution of acetate of lead, with the addition of caustic ammonia, this is now added, and the compound sought after immediately prepared, which is then ready for use, or may be strained through flannel, dried, and kept ready for application.

We now revert to the course which we propose for the adoption of the agriculturist.

The sea-weed being collected in heaps, may be suffered to drain itself of the sea-water mechanically retained about it. As this will occupy some hours, the time may be employed by women and children in trimming the stalks of the tangle (*Laminaria digitata*) of leaves and roots, and arranging them ready for the turnip-cutter and other operations, as stated above. The whole of the remainder may then be conveyed into old hogsheads, in a sheltered spot near the beach, and allowed to ferment; the succeeding operations having already been described. A quantity of liquid is now assumed to have been collected, to which is added commercial hydrochloric acid, until a very marked acid reaction is obtained; a solution of ordinary chlorinated lime is then added, to disengage the iodine, taking especial care not to use an excess. A very little practice will decide the quantity [necessary, as the brown color of the liquid will increase up to a certain point, and the smallest addition of chlorine, when this has been attained, will diminish its intensity. Having thus liberated the iodine, it is precipitated with the prepared starch diffused through water, continuing its addition until it is no longer rendered blue by the iodine. The remainder of the process consists in decanting the fluid portion, and straining the residuum, which, when dry will be immediately available to the iodine manufacturer, and from which the iodide of potassium may be formed by the addition of sulphuret of potassium, or other appropriate means. The fluid portion being rich in potash, soda, and magnesian salts, will form a most important contribution to the liquid manure-tank, or may be thrown over the compost in the farm-yard, with the additional advantage of fixing the ammonia through its excess of hydrochloric acid. The cakes of cellular tissue should be stored in a dry place, and made use of as fuel for steaming turnips, and other similar operations, taking care to preserve the ashes; these should also be lixiviated, and thus every particle of iodine may be saved.

Such is a general outline of the writer's plan. In a journal nothing more can be given ; but those who are interested in the matter will find little difficulty in expanding these views, or adapting them to special purposes.—*Chemical Gazette*, July 1st, 1850.

[Why cannot our ingenious countrymen of the ocean counties of New England, apply the facts stated by Dr. Kemp to the algaecious plants of their own rock bound coast, and thus introduce a new and valuable item of manufacture? The subject is worthy of the attention of some of our pharmaceutical brethren of Maine and Massachussetts, in a scientific, as well as in an industrial point of view. It would look well, in the enumeration of products of American origin in the World's exhibition of 1851 at London, to see Iodine in the list.—EDITOR.]

ART. LXXVII.—ON THE PURIFICATION OF CHLOROFORM.

BY MR. JOHN ABRAHAM.

In *Chambers' Journal* for May 4, is a paper by Professor Gregory, of Edinburgh, on the subject of Chloroform, which has been copied into other publications and extensively read.

He says, "as no absolutely pure chloroform has yet been sold, so far as we can ascertain, by any maker out of Edinburgh, while the large majority of the makers have sold a very inferior article, it is not surprising that its use should have proved less satisfactory, for example, in London than here. To give an idea of the fact, we may state that we have examined recent specimens which contained only three fourths, one half, one fourth, one fifth, and even so low as one twentieth of their volume of chloroform." It is not stated where these specimens were obtained, but

afterwards, he says, "fortunately for Edinburgh and for chloroform—we may add, fortunately for suffering humanity—the Edinburgh makers have always taken the best means and the greatest pains to produce good chloroform." The Professor gives what he calls a test of its purity, and "an easy mode of purification," which consists, in agitating the chloroform with sulphuric acid, and afterwards with peroxide of manganese. "It is then of specific gravity 1.500, and absolutely pure." The blackening of the sulphuric acid is a proof of impurity, and its absence the reverse.

Now, Sir, I beg to caution your readers that the fact of any sample of chloroform having been manufactured in Edinburgh, is no proof of its purity; and I would recommend them to apply another test in addition to the one suggested by the Professor.

It is well known that the Scotch manufacturers having spirit much cheaper than it can be obtained in England, have a great advantage over the English makers of chloroform. In February last, it was offered to me by one of the most respectable of the Edinburgh houses, at a price very much lower than I had ever before paid, and in consequence I obtained two Winchester quarts. It was professedly of the density 1.497. I found it about that, and I considered it good, though I thought it a shade less sweet than what I had been accustomed to use.

Last month I found that it had acquired a suffocating odor, a greenish, oily-looking substance was deposited on the sides of the bottle, and the same appearance is evident in one of the bottles which is nearly full, and which has not been opened whilst in my possession, and has been kept in a dark cool closet. Moistened litmus paper suspended over it in a bottle was first reddened and afterwards bleached. Water with which it was washed indicated hydrochloric acid in considerable quantity. The bleaching I attribute to free chlorine, as I did not find sulphurous acid. It was unfit for respiration. Sulphuric acid was but slightly discolored by it.

I next examined chloroform of Liverpool manufacture, which I had in my possession before I received the sample from Edinburgh; it showed no trace of acid or free chlorine; it discolored sulphuric acid considerably, but had no effect on litmus paper suspended as before. A slight inhalation of it produced no unpleasant effects, and as I have repeatedly inhaled and witnessed the administration of chloroform of the same maker, with the most satisfactory results, I venture to doubt whether the substance which blackens the acid is always that which produces the unpleasant effects sometimes attributed to chloroform.

I next tried the Professor's mode of purification, but after its application the reddening and bleaching of litmus paper was produced by both preparations. From the Liverpool chloroform I had not much difficulty in removing these unsatisfactory indications; but with the Edinburgh I have had great difficulty, and I have only succeeded after repeated agitations with sulphuric acid, carb. barytes, milk of lime, and several distillations. It remains to be seen whether the purification is real—whether it will keep good.

Professor Gregory gives a second test of the purity of chloroform, which he considers still more delicate than the former. He states that pure chloroform leaves no smell when allowed to evaporate from the hand, and that impure chloroform bears an odor which is generally in proportion to its effect in coloring the acid. I infer that the substance which blackens the acid is not always the same, because the facts are, in my judgment, not so in the samples of which I have spoken. I find that dropping the chloroform on paper affords the best means of applying the test, and that specimen which darkens the acid considerably, leaves, if any, the less smell. I shall be happy to send you specimens. My first note of the sp. gr. of chloroform is in Nov. 1847, about the time it was made known as an anæsthetic. It is 1.485 and 1.489. My next is 1.491, and the Liverpool chloroform, of which I have spoken, is 1.495, at 60°.

I have to-day received an 8lb. bottle of chloroform from another Edinburgh house, who showed me some time ago a certificate from Dr. Gregory, that their chloroform was absolutely pure. It has been opened and examined by an assistant in my presence. It is very similar to the former Edinburgh specimen. Its odor is similar. It reddens, and speedily bleaches litmus paper, suspended as before. Its sp. gr. at 71° appears 1.490 in a bottle graduated at 60° . It scarcely colors sulphuric acid. I have not had time to make a more complete examination.—*London Pharmaceutical Journal*, July 1, 1850.

ART. LXXVIII.—THE TABLE LAND OF THIBET.

BY JOSEPH DALTON HOOKER.

In April last we had occasion to speak of the first fruits of Dr. Hooker's mission to explore the botanical and physical character of the Himalaya. He had ascended the eastern extremity, within sight of the great snowy range, of which the peak Kinchin-junga, altitude 28,172 feet, is the loftiest yet known in the world,—and was anxiously waiting in the environs of Darjeeling, with the view of reaching the great table-land of Thibet, and determining the questions submitted to him by Humboldt relative to its elevation and snow lines. Owing to the jealousy with which the frontiers are guarded by the Chinese and Sikkim tribes, and the difficulty of obtaining provisions and guides, it was some months before Dr. Hooker could make the pass.—This, however, has been effected:—as the following letter describes.

Tungu, N. E. Sikkim, alt. 13,500 ft. July 25, 1849.

I have at length carried my point, and stood upon the table-land of Thibet, beyond the Sikkim frontier, at an ele-

vation of 15,500 ft., at the back of the great range of snowy mountains. The pass is about ten miles north of this. We have Thibetan ponies, mounted thereon *à la Tartare*, but I walked a considerable part of the way, collecting many new plants. The Thibetans come over the frontier in summer to feed their Yaks, and reside in horse-hair tents. I entered one and was much amused with a fine Chinese-looking girl, a jolly laughing wench, who presented me with a slice of curd. These people eat curd with herbs, milk, and Fagopyrum bread—only the richer can afford to purchase rice. They have two sorts of churn; one is a goat-skin, in which the cream is enclosed and beaten, stamped upon and rolled; the other is an oblong box, a yard in length, full of rhododendron twigs, frosted with butter—and maggots. Some miles farther we reached the tents of Poppin, the Lachen Soubah, and were most graciously received by his squaw and family. The whole party squatted in a ring within the tent, myself seated at the head on a beautiful Chinese mat. The lady of the Soubah made tea, adding salt and butter, and each produced our Bhotea cup, which was always kept full. Curd, parched rice, and beaten maize were handed liberally round. Our fire was of juniper wood, and the utensils of clay, moulded at Dijarchi, except the bamboo churn, in which the tea, salt, and butter were churned previous to boiling. * * Presently a tremendous peal, like thunder, echoed down the glen. My companions started to their feet, and cried for me to be off,—for the mountains were falling and a violent storm was at hand. We pursued our way for five or six miles in a thick fog; the roar of the falling masses from Kinchin-jow on the one hand and Chomoimo on the other being truly awful. Happily, no fragments can enter the valley, by reason of the low hills which flank the river along whose bed we were journeying. Violent rain ensued, and drenched us to the skin. Gradually, as we ascended, the valley widened; and at the altitude of about 15,000 feet we emerged into

the broad, flat table-land, composed of range after range of inosculating stony terraces, with a little herbage, amongst which the Lachen river meanders. Five hundred feet farther we found ourselves at the top of a long flat ridge, connecting the northwest extreme of Kinchin-jow with Chomoimo,—and here stood the boundary mark. Happily, the weather cleared. Northward the plateau dipped by successive very low ridges, overhung with a canopy of the vapors that had deluged us. Easterly was the blue sky and low ridges of the lofty table-land, which here backs the great range. To the west the spurs of Chomoimo and much mist veiled the horizon. Southeast Kinchin-jow, a flat topped mass of snow, altitude 20,000 feet, rose abruptly from rocky cliffs and piles of *débris*. Southwest was Chomoimo, equally snow; while southward, between these mountains, the plateau dipped into the funnel-mouth head of the Lachen valley. Here I had an opportunity of solving the great problem—the elevation of the Snow Line. Strange to say, there was not a particle of snow to be seen anywhere *en route*, right or left, nor on the great mountains for 1,500 feet above my position. The snow line in Sikkim, lies on the Indian face of the Himalayan range, at below 15,000 feet—on the Thibetan (northern) slope at above 16,000! I felt greatly delighted, and made a hasty sketch of the surrounding scenery:—somewhat rude, for at this great elevation my temples throb, and I retch with sickness.

Just above 15,000 feet all the plants are new; but the moment you reach the table-land nine-tenths of them disappear. Plants that are found at 12—13,000 feet on the Indian approaches to Thibet, did not ascend to the top of the Pass; still, as I always expected, at the turning point where the alpine Himalayan vegetation is to be soon replaced by Thibetan sterility, there is a sudden change in the *Flora*, and a development of species which are not found farther south, at equal altitudes in the Himalaya. We made a fire

of Yak dung dried, and blew it up with bellows of goat skin, armed with a snout of Yak's horn. My poor Lepchas were benumbed with cold. I stayed an hour and a half on the Thibetan side of the frontier, and obtained good barometrical observations, and others with boiling water,—but the latter process is infinitely the most troublesome. On our return the weather cleared magnificently, and the views of the great mountains already named, rising perpendicularly, exceeded anything I ever beheld. For 6,000 feet they rise sheer up and loom through the mist overhead; their black wall-like faces patched with ice, and their tabular tops capped with a bed of green snow, probably from 200 to 300 feet thick. Southerly down the glen the mountain sunk to low hills, to rise again in the parallel of the great chain, twenty miles south, to perpetual snow, in rugged peaks. We stopped again at Peppin's tent for refreshment, and I again took horse. My stubborn, intractable, unshod Tartar pony never missed a foot. Sharp rocks, deep stony torrents, slippery paths, or pitch darkness, were all the same to him. These ponies are sorry looking beasts; but the Soubah, who weighs sixteen stone, rode his down the whole thirty miles of rocks, stones, streams and mountains; and except to stop to shake themselves like a dog, with a violence that nearly unhorsed me neither his steed nor mine exhibited any symptoms of fatigue. Fever rages below from Chootam to Darjeeling. My people behave admirably, and I never hear a complaint; but I find it very hard to see a poor fellow come in, his load left behind, staggering with fever, which he has caught by sleeping in the valleys, eyes sunk, temples throbbing, pulse at 120, and utterly disabled from calling up the merry smile with which the kind creatures always greet me. We have little rain, but much mist; and I find great difficulty in keeping my plants in order. Do not be alarmed for me about fever, for I shall not descend below 6,000 feet. I have not been below 10,000 feet for the last two months. I lead a hard but

healthy life; and know not what it is to spend a lonely-feeling hour, though without a soul to converse with.—Arranging and labelling plants, and writing up my journal, are no trifling occupation, and I am incessantly at work.—*Silliman's Journal March, 1850, from Athen.* 1146.

LXXIX.—ON A TEST FOR DISTINGUISHING ACETONE FROM PYROXILIC SPIRIT, AND ON THE QUESTION, WHAT IS THE WOOD-NAPHTHA OF DR. HASTINGS?

[Several years ago, soon after the employment of acetone in phthisis was suggested by Dr. Hastings, we published an article from the *Pharmaceutical Journal*, which indicated acetone or pyroacetic spirit as the agent designed by him. We now publish a notice by Mr. Scanlan, from the same *Journal* for April, of a test for distinguishing acetone from pyroxilic spirit, together with a discussion bearing upon the subject, in which Dr. Hastings took part, by which it appears that pyroxilic spirit and *not* pyroacetic spirit is the true *wood naphtha*. On applying the test to a specimen of commercial wood naphtha, we find it indicates *pyroxilic spirit*.—EDITOR.]

It is now some years since Dr. Hastings introduced to the medical world naphtha as a new therapeutic agent in phthisis.

As there are several fluids to be met with under the name of *naphtha*, considerable doubt existed as to which of them should be used as “medical naphtha” by the compounder. The only tests relied upon, I believe, for a long time, were miscibility of the naphtha with water without becoming milky, and its not being blackened by the addition of a drop or two of concentrated sulphuric or of nitric acid. Any

“wood naphtha” met with in commerce, when repeatedly rectified, over quick lime, will be found to stand these tests; and hence, when so rectified, was considered to be the proper naphtha to be used in medicine.

A question subsequently seems to have arisen as to the dependence to be placed upon these tests, and it was asked, Is it pyroacetic or pyroxilic spirit that should be used?—and how are we to distinguish readily between the two? Accordingly we find this subject fully discussed in the *Pharmaceutical Journal* so far back as the year 1843, vol. iii., p. 33.

In this article upon Naphtha, it is stated that pyroacetic spirit, or acetone, “is the kind of naphtha which Dr. Hastings uses;” and a mode of distinguishing this fluid from pyroxilic spirit, or ordinary wood naphtha, is pointed out as suggested by Dr. Ure. It is the way in which nitric acid acts upon these two different substances. This test may be depended upon; but is almost dangerous, as nitric acid of sp. gr. 1.45 acts with explosive violence upon acetone.

Chloride of calcium affords us a much more ready and certain mode of distinguishing acetone from wood-spirit naphtha, the former having no action upon it, while the latter dissolves and combines with it. It will be found that a drop or two of a *saturated* solution of chloride of calcium, added to pyroacetic spirit in a test tube, is immiscible with it, and separates after agitation, whilst such a solution is instantly dissolved by the pyroxilic spirit.

It should be ascertained beforehand, that the “naphtha” under examination does *not* separate into two fluids, or become milky on the addition of water.

Mr. Bell, in resuming the discussion, said that, although it was very important to have a ready means of distinguishing the different liquids which are sold under the common name of *naphtha*—and Mr. Scanlan appeared to have supplied this deficiency—yet there was another

equally desirable object to be attained, and that was to ascertain which kind of naphtha ought to be used in medicine when prescribed for pulmonary affections. He was glad to see that Dr. Hastings, who had originally introduced the use of naphtha as a medicinal agent, was present, and he hoped that he would favor the meeting with the result of his experience on the subject. There were several specimens of naphtha on the table, some of which had been used under Dr. Hastings's observation, and he would suggest that the test should be applied to these, so as to determine whether they were acetone or pyroxilic spirit.

On applying Mr. Scanlan's test, it was found that those specimens which had been most approved of as medicinal agents, were pyroxilic spirit.

Dr. Hastings observed that the subject then before the meeting was one in which he was deeply interested. He had found from long experience, that some of the liquids, sold under the name of naphtha, afforded relief, by allaying irritation, in certain cases of pulmonary affection; but while this was the case with some of the naphthas of commerce, there were other specimens which produced an opposite effect, and promoted instead of allaying irritation. He had never been able to ascertain what the real cause of this difference in effect was, and the uncertainty as to whether a patient got the right kind of naphtha or not, had been to him a constant source of annoyance and difficulty. Some time ago it was suggested to him by several chemists who had directed their attention to the subject, that the true medicinal naphtha—that which, from experience, he found to be beneficial—was acetone, or pyroacetic spirit, and not pyroxilic spirit; and accordingly several manufacturers, and among them the house in which Mr. Scanlan is engaged, had carefully prepared pyroacetic spirit in a state of considerable purity for medicinal use. He could not say that his experience in the use of this, or of any of the specimens which by the use of Mr. Scanlan's test were proved

to be acetone enabled him to give the preference to acetone over pyroxilic spirit, and he still felt that the difficulty hitherto experienced was not yet removed. It appeared also that the proposed test was not a conclusive one, for he had found that it gave the same reaction with coal-tar naphtha as with acetone.

Mr. Redwood explained that the test was only intended to be used as a means of distinguishing between acetone and pyroxilic spirit. He thought it was now sufficiently evident that the kind of naphtha best suited for use in the cases in which it was prescribed by Dr. Hastings, was purified pyroxilic spirit, and not acetone, or pyroacetic spirit.

Mr. Morson had no doubt that pyroxilic spirit, and not acetone, was what Dr. Hastings referred to under the name naphtha. It was much to be regretted, that the term *naphtha* had been used to designate this liquid, as it was a very indefinite term. He would suggest the substitution of the term "wood spirit." It was not all specimens of wood spirit, however, that could be used medicinally in the cases alluded to. Most of the wood spirit of commerce was very impure, and required a particular process of purification to render it fit for medicinal use. It might be purified by largely diluting it with water, when an oily substance separates, after the removal of which, the spirit may be recovered by distillation.—*Pharmaceutical Journal*, April, 1850.

ART. LXXX.—POISONING BY HYDROCYANIC ACID, AND
BY OIL OF CINNAMON.

Dr. Christison relates, in the *Monthly Jour. of Med. Sci.* (Feb. 1850,) a case of poisoning by hydrocyanic acid which is interesting from leading to the following practical deductions.

1. It renders it highly probable that a grain and a half

of radical hydrocyanic acid is adequate to produce death in the human subject.

2. That death may be caused by hydrocyanic acid without any odor of it being remarked in the breath, or in the first fluid withdrawn from the stomach, even although the odor be carefully sought for, and although the poison be present.

3. The notion entertained by various writers in the London journals, on the occasion of the trial of Tawell, that it is an invariable circumstance, that a piercing cry ushers in the action of a poisonous dose of hydrocyanic acid, is evidently erroneous, and founded on limited experience.

4. That the cold douche on the head is an energetic remedy, when other means available in so urgent an emergency are inefficacious.

M. G. C. Mitscherlich, from his experiments on animals, gives the following facts and conclusions :—1. That oil of cinnamon is a poison. Six drachms killed a moderate-sized dog in five hours ; and two drachms, in forty hours. One drachm induced illness of several days' duration. That it is a weaker poison than oil of mustard or savine, and stronger than oil of fennel, citron, turpentine, or copaiba balsam. 2. That oil of cinnamon is absorbed, is shown by the distinct odor of the oil in the abdominal cavity after death, and also, though to a smaller degree, in the blood. 3. Given in large doses, it can be detected by its aromatic odor in the deep yellow scanty urine ; and its odor can be perceived somewhat less distinctly in the breath expired. 4. The oil of cinnamon produces somewhat similar changes of structure in the stomach and intestines as the oil before mentioned. In the mouth, effusion of blood and vesication of the mucus membrane, without pre-existing inflammation. In one case there was a portion of the mucous membrane of the larger curvature of the stomach, one inch long and half an inch broad, which was of a gray color,

through which the muscular coat appeared ; the adjoining muscular membrane was inflamed. This surrounding inflammation extended for some distance around, and gradually passed into the natural color. The nature of this change the author could not determine. In the small intestines the epithelium was found removed, and they contained only mucus. Besides these, the blood was found dark and slightly coagulated. The kidneys in their cortical substance, and the liver, were congested. 5. The most frequent symptoms of poisoning were—increase of the heart's impulse, slightly accelerated breathing, restlessness, evacuation of the contents of the larger intestines, no increase of the urinary excretion, muscular debility with loss of sensibility, loss of the frequency and strength of the heart's action, slow and difficult breathing, coldness of the extremities, and death without convulsions. The phenomena during life [are clearly attributable to the absorption of the oil, as the appearances discovered after death are not sufficient to account for the fatal effects. In a few cases where the dose is not fatal, the same symptoms in a less degree were observed, and were followed by obstinate costiveness. —*London Med. Gaz.*, Nov. 1849, *from Preussische Vereinszeitung*, No. 26, and *Hays' Journal*.

ART. LXXXI.—METHOD OF DEPRIVING QUININE OF ITS
BITTERNESS.

By RICHARD H. THOMAS, M. D., of Baltimore.

Baltimore, 2d mo. 15th, 1850.

To Dr. Isaac Hays :

DEAR DOCTOR—Believing that I have discovered a method, by which quinine may be quite deprived of its great bitterness, without injuring its virtues in the least, I

take this method of making it known to the profession. Perhaps I may be anticipated; but if it be so, I am not aware of it.

In 8th month (August last,) having occasion to prescribe for a little patient, who was affected both with diarrhœa and intermittent fever, I ordered a combination of quinine and tannic acid. The child took it so readily that I tasted it, and was surprised to discover no taste of quinine; which I at once attributed to the combination.

I have since prescribed it in a number of instances, and found that while it was equally effectual, it was far more palatable than any other combination of quinine I was acquainted with. On referring to the *American Journal of the Medical Sciences*, Vol. xix. p. 219 (1836,) it will be found that Dr. Ronander, Secretary of the Swedish Medical Association, recommended, in 1834, the tannate of quinine and cinchonin as the most active ingredients of the Peruvian bark; he asserts that he has cured by their means several cases of obstinate ague, which had resisted the use of sulphate of quinine, and other powerful remedies, &c., &c. Nothing is said in the extract, from the original paper in *Hecker's Annals*, Dec'r, 1834, of the taste of the tannate of quinine. Compared with the sulphate it is almost tasteless.

The following is the extemperaneous prescription I am in the habit of ordering for a child two years old: R. Quiniæ sulph. gr. x; acid. tannici gr. ij; aqua ℥vj; syrup aurant. ℥ij. M. A teaspoonful every hour or two.

I enclose a note on the subject from one of our most intelligent and careful apothecaries.

Baltimore, February 6th, 1850.

DEAR SIR—I find, after trying a number of times combinations of quiniæ sulphas and acidi tannici in different proportions, that ten grains may be deprived of its bitterness in a great degree, by the addition of one grain and a half of tannic acid. I think this is a proper proportion.

Respectfully,
Dr. R. H. Thomas.

JAMES V. D. STEWART

ART. LXXXII.—SOME ACCOUNT OF THE VEGETABLE IVORY PALM. (*Phytelephas macrocarpa*.)

BY SIR W. J. HOOKER.

[The following interesting notice, taken from the Pharmaceutical Journal for February, has been considerably abridged, those portions of a purely botanical interest being left out, together with two wood-cuts illustrative of the plant and its products.—EDITOR.]

It is not for the first time we here make the observation that the vegetable products, best known in commerce, in the arts, &c., are frequently the least known *botanically*. A striking example in proof of this statement may be found in the fact, that familiar as every one is with the substance called *Vegetable Ivory*, Dr. Von Martius is obliged to bring to a conclusion his *Opus Magnificum* on the Palms, without being able to figure, or even to describe from the life or from well-dried specimens, the species which yields this singular substance. The very last genus noticed in the work just mentioned, is *Phytelephas*, and the author concludes his account of it with the remark: "Descriptio ex iconibus Gaudichaudianis et exemplari manco;" and these figures of Gaudichaud (*Voyage de la Bonite*) only exhibit the fructification, unaccompanied by any history or explanation.

We are far from expecting to fill up all that is wanting to the history of the *Vegetable Ivory*, our living plants are but young, and our own specimens, how superior soever they may be to those possessed by other botanical cabinets, are far indeed from being complete; for it is well known how difficult it is to procure available specimens for illustration of these "Princes" of the vegetable kingdom. The Royal Gardens, however, when sending out a collector to New Granada in 1845, did not fail to direct his attention to the

importation of this plant; so that living specimens may now be seen in our stoves, and well-preserved specimens in various, but not in all states, in one of the cases of the Museum. From these, and from other sources, our brief history will be derived.

The first notice of the existence of the *Vegetable Ivory Palm* was given by Ruiz and Pavon, in their *Systema Vegetabilium Floræ Peruvianæ et Chilensis*, published at Madrid, in 1798. There, under the name of *Phytelephas macrocarpa*, we find the following account of its native names and properties:—

“It is called *Pullipunta* and *Homero* by the Indians of the hot and low valleys of the Andes of Peru, about Chanchamoya, Vitor, Cuchero, and San Antonio de Playa grande, its native locality—*Palma del Marsil*, and *Marsil vegetal* by the Spaniards;—while the fruit, on account of its size and appearance, is called *Cabeza de Negro*. The Indians cover their cottages with the leaves of this most beautiful Palm. The fruit at first contains a clear insipid fluid, with which travellers allay their thirst; afterwards this same liquor becomes milky and sweet, and it changes its taste by degrees as it acquires solidity, till at last it is almost as hard as ivory. The liquor contained in the young fruits turns acid if they are cut from the tree and kept some time. From the kernel the Indians fashion the knobs of walking-sticks, the reels of spindles and little toys, which are whiter than ivory, and equally hard, if they are not put under water; and if they are, they become white and hard when dried again. Bears devour the young fruit with avidity.”

This species, *P. macrocarpa*, is characterized by having a “short caudex and very large heads of fruit,” which distinguish it from a second supposed species “destitute of caudex and with small fruit,” *P. microcarpa* possessing the same native names and properties.

Humboldt next detected the palm in New Granada, especially common on the banks of the Magdalena, where it is

known by the name of *Tagua*, and where, he tells us, "buttons are made from the hard bony perisperm of the seed." Gaudichaud, in the still unfinished *Partie Botanique* of the *Voyage de la Bonite*, devotes three plates to the illustration of the flowers and fruit of what he deems several species of *Phytelephas* of Peru and Columbia; but being, as we have already observed, unaccompanied by any observations, we are ignorant on what grounds he rests his distinctive characters.

At what period these seeds or "nuts" were first brought to England to be used by turners, &c., we have no means of ascertaining, nor to what extent they are now imported. MacCulloch, in his *Dictionary of Commerce*, and Dr. Ure, in his *Dictionary of Arts, Manufactures, &c.*, are alike silent. But from the use that is made of them, the amount is probably considerable, and in the turners' and toy-shops of London may be purchased, for a shilling each, the nuts, or more properly speaking the seeds, either entire, or with one-half of the coat removed by turning, so as to exhibit the beautiful ivory-like texture of the interior. The entire seeds thus purchased had been planted in our garden; but they had never been made to germinate. Hence, all due instructions were given to Mr. Purdie when he was sent on his botanical mission, some account of which is published in the *Companion to the Botanical Magazine*, and in relation to the *Phytelephas* or *Tagua* in particular, in the volume for 1847. We there learn that the palm inhabits dense shady woods on hills facing the Magdalena, in the province of Ocana, at an elevation of 1,000 to 3,300 feet above the level of the sea; never growing in hot plains or level country. At the season when the flowering takes place, the country is said to be scented with its fragrance, and when the fruit is advanced, all wild animals, especially hogs and turkeys, are extremely fond of it. "Enclosing the seeds," observes Mr. Purdie, "is a yellow sweet oily pulp, which is collected at the proper season (October) and sold, under the name of *Pepe del Ta-*

gua, for one real a pound, at Ocana. A spoonful of it, with a little sugar and water, makes the celebrated *Chique de Tagua*, said to be the most delicious beverage of the country."

The fruit of the *Phytelephas* will be considered of more interest by our readers than the flowers. The size of our large fruits is ten inches across, and twenty-five in circumference: they appear at the base of the leaves on very short stalks, the great heads (*Cabeza de Negro*, like Negroes' heads, whence that name) resting on the ground, or lodged among the axils of the foliage, constituting a dry Drupe; that is, the covering to the seeds in an early stage is soft, fluid, or pulpy, but eventually dries up into a hard, almost woody mass, 3—4 or 5-lobed, and everywhere embossed with conical, angular tubercles, something like the coat of a pine-apple. These tubercles, however, vary remarkably in size and length, giving an impression that there are several species of the genus. Within each lobe are several (the number would appear very uncertain) large, hard, smooth, oval, or obovate, or almost spherical seeds, of a greyish-brown color, sometimes with the sides flattened by pressure, sometimes depressed. In this state they are sent to Europe, for it is they which contain the ivory-like substance. The outer coat, hard and crustaceous, is easily removed, when a thin brown skin appears, marked with anastomosing vessels, and distinguished by a hole or foramen, indicating the position of the embryo. Within this skin, the whole is occupied from the centre to the circumference, with the exception of the small embryo, by the albumen, the food of the young plant, analogous to the white of an egg; and the albumen (which, in the cocoa-nut is soft and fleshy and eatable) is here firm and hard, in appearance exactly resembling ivory, hence employed by the mechanics, as far as the size will allow, for various purposes in turning, &c., as a substitute for ivory, a much more expensive article. What is wanting in size, however, is often made up by the skill and ingenuity of the workman: when

an article is turned it easily permits of pieces being added to it without the blemish being exposed to view; and where a lid is required for a box of vegetable ivory, a separate seed is used for the lid.

Thus we have another, among many instances, of a vegetable product so nearly resembling, and exactly resembling to the eye, an animal substance (and that of a very distinct yet familiar character) as to be frequently passed off for such; and the generic name, *Phytelephas*, (Ruiz and Pavon,) will thus be found to be very appropriate, being derived from *φυτον*, a *plant*, and *ελεφας*, an *elephant*, for as the elephant is the ivory-bearing animal, so the *Tagua* is the ivory-bearing plant. Much, however, as the albumen of the seed of the *Phytelephas* resembles animal ivory at the first glance, its internal organization is extremely different, as may be expected. That of the seed of Palms, generally, has been admirably illustrated with figures and descriptions by Hugo Mohl; but that of the plant under consideration has especially occupied the attention of Professor Morren, of Brussels, in the second part of the first volume of *Dodonæa, ou Recueil d'Observations de Botanique*, p. 74, from which we give the following extract, and we must refer to the plate itself of that work (Tab. II.) for the highly magnified appearance of this beautiful and curious structure, and to the several figures to which reference is frequently made:—

“The external covering of the ivory-nut (seed) is so hard as to be almost stony, yellowish-grey, smooth, and destitute of gloss; it is attached to a second coating, which is brown, porous, and dull, and is incorporated with it. Beneath a hollow, which separates these two integuments, is a third, brown, veined, warted and glossy covering, traversed by numerous fibres, under which lies the albumen which forms the vegetable ivory. The vegetable ivory is of the purest white, and free from veins, dots, or vessels of any kind, presenting a perfect uniformity of texture, surpassing the finest animal ivory; and its substance is everywhere so hard, that the slightest streaks

from the turning-lathe are observable, and cannot be erased till it is newly fashioned.

“When the article is carved, the vegetable ivory may be known by its brightness, and by its fatty appearance, whereon the well-skilled may discern the minute lines which are the beds of cells. Its structure would almost seem to show more analogy with bone than with ivory; but a microscopic investigation quickly proves that vegetable ivory possesses an entirely different structure.”—*Hooker's Journal of Botany*.

ART. LXXXIII.—ON OIL OF THYME, COMMONLY SOLD AS
OIL OF ORIGANUM.

BY DANIEL HANBURY.

The vast number of plants included in the botanical order of Labiataë, and the very close alliance of many, render it not surprising that the history of their essential oils should in a few instances be involved in a degree of confusion or doubt. Nor is this the less to be wondered at, when we reflect on the great similarity of many of these oils, our imperfect means of distinguishing them and of ascertaining their purity, the unavoidable alteration produced on some by extraction, to say nothing of differences arising from locality, or from want of care in conducting the process of distillation.

The essential oil which I propose to submit to notice at this time, is not one of importance to medicine; yet having had the opportunity of visiting the district where it is obtained, I have elicited a few facts regarding it which appear sufficiently interesting to be laid before the Pharmaceutical Society.

The volatile oil sold by chemists as *Oleum origani* is often popularly, and almost always commercially, termed *Oil of*

Thyme. Writers on *Materia Medica* generally mention the latter name as an *incorrect* appellation of the true *oleum origani vulgaris*, a statement, the converse of which I believe to be by far more usually the case.

During a visit to the South of France in the autumn of last year, I procured from the manufacturer a sample of an essential oil of thyme, as well as a specimen of the plant from which it was distilled. This oil, which was submitted to Dr. Pereira, proved to be identical with the "*oleum origani*" of English druggists; and the plant, which was kindly examined by Dr. Lindley and G. Benthem, has been ascertained to be *Thymus vulgaris*. The latter gentleman in a note to me states, that the plant in question is "the true *Thymus vulgaris*, so abundant on the arid wastes of Lower Languedoc as to be much used with rosemary and lavender for fuel."

Thymus vulgaris, the common thyme of the gardens, is collected from the rocky hills in the department of Gard in the South of France, and the entire plant is submitted to distillation with water. The oil, which is of a reddish-brown color, is called *Huile rouge de Thym*. Redistillation renders it colorless, and it is then termed *Huile blanche de Thym*. The colored oil, however, is that most commonly sold.

The trade of distilling oils of thyme, lavender, rosemary, &c., is chiefly in the hands of small manufacturers at Milhaud, Aujargues, Souvignargues, and other villages in the vicinity of Nismes. From the makers, the oils are purchased by the merchants in the neighboring towns, and thence exported to distant parts.

The question naturally arises,—is all the "*oleum origani*" used in this country thus derived? I believe it to be so. I have not been able to discover that any is manufactured here, nor have I succeeded in procuring a sample so essentially differing from oil of thyme, as to warrant my believing it to be genuine oil of *origanum*. The extremely low price at which oil of thyme can be produced in the South of

France, and the common purposes to which it is applied, seem to preclude all attempt at competition in other localities. Cheap, however, as it is, it is yet occasionally the subject of adulteration with oil of turpentine, whose odor in such case may be readily detected, especially on comparison with a good sample.

That the consumption of oil of thyme in this country is considerable, may be gathered from the following extract from "*An Expository Statement of the Consumption of imported Commodities within the United Kingdom in two years preceding and in two years following the establishment of the New Tariff, presented to both Houses of Parliament, by command of Her Majesty, 1845.*"

OIL OF THYME.

<i>Quantities retained for Home Consumption.</i>			
Years ending 5th January.		Years ending 5th July.	
1839.	1841.	1843.	1844.
11,938 lb.	8,818 lb.	7,991 lb.	7,553 lb.

Although the duty under the new tariff was reduced from 1s. 4d. to 1s. per lb., the consumption declined. Whether it has continued so to do, it is not easy to ascertain, as no official return similar to that above quoted has since been published.—*Pharmaceutical Journal*, July, 1850.

REVIEW.

ART. LXXXIV.—THE ENCYCLOPEDIA OF CHEMISTRY, Practical and Theoretical: embracing its application to the Arts, Metallurgy, Mineralogy, Geology, Medicine, and Pharmacy. By JAMES C. BOOTH, A. M., M. A. P. S., Melter and Refiner in the U. S. Mint, Professor of Applied Chemistry in the Franklin Institute. Assisted by CAMPBELL MORFIT, Author of "Applied Chemistry," and "Chemical Manipulations." Second Edition. 1 vol., royal 8vo. pp. 974. Philadelphia: Henry C. Baird, successor to E. L. Carey. 1850.

So many treatises on Chemistry and its branches have been presented to the public within the last few years, and so varied have been their pretensions and their merits, that the student of this interesting science would find it a puzzling task to form any accurate idea as to which of the competitors for his notice would most profitably repay perusal, or would best elucidate the particular subjects of his investigation. In the "Encyclopedia" just published by Mr. Baird, we have a new aspirant for popular favor, or rather an improved and enlarged presentation of a work which has already met with a favorable reception from the public; and though but a hasty and superficial glance at its deserts is designed at present, it is hoped that even such an imperfect sketch may serve in some slight degree to assist or guide the judgment of the inquirer.

In its general plan, it is obviously modeled on the Dictionary of Chemistry of Dr. Ure, though, as the author has correctly remarked in his preface, "the science has so entirely changed its features, as to render that work of no avail; nothing has in consequence been taken from it." Indeed, throughout the volume there is exhibited the result of diligent and laborious comparison, and occasionally the traces of original research; and though such a production must of course necessarily be chiefly a compilation, it is evident that Mr. Booth and his coadjutors, Dr. Boyé and Mr. Morfit,

have exerted themselves to render the Encyclopedia a new as well as full treatise on Chemistry.

The alphabetical arrangement of subjects characteristic of an Encyclopedia has, as applied to this science, both peculiar advantages and disadvantages; but it is probable that for a work of popular character, and one destined for a comparatively extended circulation, the latter far outweigh the former. If much of the system of the subject is by this means sacrificed, and much of the beautiful relations and dependencies between the different departments, and the varying reactions of this extensive branch of knowledge, overlooked, which contribute so much to its unity, simplicity, and precision, and indeed constitute chiefly its claims to the character of a science, there is gained on the other hand the great convenience of a classification best adapted to facilitate a ready reference,—a desideratum occasionally of no slight advantage even to the professional adept, and of invaluable utility to the student and the tyro. Besides which, this mode of arrangement seems best adapted to receive the additions or modifications continually rendered necessary by the never-resting advance of chemical discovery, and to permit their incorporation in the work with least violence to its previous order or general character.

In looking over this work, there seemed to us a striking deficiency in its plan—in the absence of an introductory chapter, giving a general view of the subject detailed in its pages. Considering the necessarily isolated nature of its disquisitions, it is almost an essential that it should open with a brief treatise, comprising a concise account of the objects, province, and limits of the science, a history of its progress, including a sketch of the more important discoveries which have constituted its epochs; and finally a notice of the barriers which seem to stand in the way of its more abstruse researches, and incidentally thereto, a review of the more striking *mirabilia* which present themselves to the chemical student to startle and delight only to dissatisfy and bewilder

Such an essay, while it would possess an exceeding interest to the general reader, would form the very best preparation for, and introduction to, the expositions which should follow. The short article on the subject which is given in the body of the work, is not only too scanty and incomplete, but scarcely seems to occupy a proper place amid a series of topics, *all* of which are assumed to be its subordinates.

From the nature of such a publication,—the joint production of various pens,—and from the different degrees of attention naturally bestowed on different parts, it is not surprising that there should be considerable inequality in the performance; but there will be found occasional inaccuracies of expression or construction, which mar the elegance, and sometimes the perspicuity, of the composition. This is no doubt owing to the hurry almost unavoidably attendant upon the preparation of so voluminous a book for the press.

It is perhaps scarcely worthy of note, that several chemical terms have been omitted, which we should have expected would have found a place in the “Encyclopedia;” while others are occasionally met with, scarcely connected with the science or the practice of Chemistry.

It would have formed a very interesting paragraph under the head of “Synthesis”—after noticing the very slight advance as yet made in this department of chemical science, in comparison to that made in analysis, and remarking upon the difficulties which beset the subject, together with some of their probable causes—to have enumerated the more important attempts which have been made at different times by philosophers to reconstruct the familiar materials which Nature so readily obtains in prosecuting her wondrous mechanisms, and to have exhibited in detail the few instances wherein they have been successful in obtaining organic products by combining their elements. The difficulties which surround this most curious branch of scientific inquiry will be partially illustrated by the simple yet puzzling phenomenon of *isomerism*. When we turn, for instance, to the word “Hy-

drogen" in the Encyclopedia, and find there given a list of *ten* different proximate principles or other substances, distinctly marked and separately recognised, each one composed of the same two elements, in exactly the same proportions—namely, of Carbon and Hydrogen in equal quantities; or when we discover in the table of "Essential Oils" at least *thirteen* of the series varying greatly in their external properties, yet all composed of the same two elements, in the uniform proportion of 4 equivalents of the former to 5 of the latter, we may form some idea of the variety of unknown circumstances necessary to determine that a combination of these constituents in the proper quantities shall certainly result in any one of these substances rather than in any other of the series. And yet who shall venture to pronounce that in the illimitable progress of chemical science, man shall not also attain to this high triumph of chemical art?

We have noticed, once or twice, that the formulæ for chemical compounds given in the Encyclopedia differ slightly from those of some of our other authors; which is no doubt the result of a discrepancy in the analysts from whom the statements are received. It would perhaps have increased the scientific value of this compendium, to have presented, in all such cases, the authorities for the proportions adopted.

Having thus freely, though cursorily, alluded to what appear to us the slight deficiencies of Mr. Booth's work, it would be exceedingly unjust to its authors, not to express in much stronger terms our sense of its many merits and general excellence. Almost every subject connected with Chemistry is treated of in a concise and generally very perspicuous manner; and we are thus furnished with a mass of information upon the science which could be obtained from no other single volume. The production of such a book has evidently demanded the most assiduous and laborious application from those engaged in it, and the result may well afford them gratification. The Encyclopedia is enriched throughout with a large amount of appropriate statistics,

collected in the form of tables ; and, under the subject "Analysis" we have presented to us a most valuable chart of this kind, exhibiting all the more ordinary combinations of each of the elementary substances, and furnishing the means of determining, from the ascertained amount of any such product, the required amount of the element entering into its composition.

In the department of Mineralogy, we are pleased to find that Mr. Booth has bestowed a share of attention due to the importance of the subject; illustrating, with tolerable fullness, a branch of the science which has been too generally neglected by our writers of chemical treatises.

In all the branches, there appears to have been incorporated into the work the results of the more recent investigations and discoveries, thus making it a complete exposition of the present state of chemical science ; so that the student who, with a good elementary treatise, shall possess himself of the Encyclopedia, may consider himself furnished with the grammar and dictionary of this province of knowledge.

The article on "Electricity," by Prof. M'Culloh, is a very complete and able essay on that subject, and, if published separately, would form a most interesting and valuable pamphlet.

On the whole, we have formed a high opinion of the value of the book, and would recommend all desirous of placing in their bookcases a comprehensive survey of chemical science for reference, to provide themselves with the "Encyclopedia of Chemistry" of Mr. Booth.

Before closing, we should notice the minor, though by no means unimportant, subject of its external appearance. The book has been got up in a very neat and substantial library style, handsomely illustrated with wood-cuts, together with a series of engraved plates at the close of the volume. Its general appearance is highly creditable to its enterprising publisher, and we have no doubt it will meet with a sale proportioned to its merits.

A. B. T.

VARIEITIES.

On the Concentration of Sulphuric Acid in Cast-iron Pots.

By MR. RODER, Apothecary.—The platina stills used in large oil of vitriol manufactories are very costly, and the glass retorts, which were formerly employed for concentrating the so-called pan-sulphuric acid, are easily broken and inconvenient. Mr. Roder, apothecary, tried therefore cast-iron enamelled pots, and satisfied himself that the enamel was not at all destroyed by boiling sulphuric acid. It is well known that enamelled vessels suffer much, if the contents are evaporated to dryness; with liquids, however, even if they be strong acids, this is not the case, supposing that the enamel is very good, and properly fused.

The enamel of the cast-iron pots employed by *Roder* was prepared in the following manner:—1 part burnt alum, 4 parts red lead, 2 parts siliceous earth are ground as finely as possible, mixed together, and then fused till the mass flows gently; it is then plunged in water and again pulverized.

Of this powder, fifteen parts are triturated as finely as possible with twenty parts of siliceous earth, and three parts of tin-ash or oxide of tin, then rubbed down with oil of turpentine, and applied by means of a soft brush to the interior surface of a carefully polished and smoothly turned cast-iron pot; the operation is repeated three or four times, but not before the preceding coating has become perfectly dry. Pots with flat circular bottoms are the best for this purpose. The mode of fusing the enamel is known.

With regard to the concentration of the pan-sulphuric acid in these pots on a large scale, the best plan will be to have a heating-apparatus for four pots, each for two or three hundred-weight of acid. Larger pots would considerably in-

crease the expense, whilst, by four or six such heating apparatus, with which sixteen to twenty-four pots can be constantly kept in operation, larger quantities can at once be concentrated than have ever been concentrated in the largest platina still, and that at only the sixth or eighth part of the cost, not reckoning the expensive repairs which a platinum still requires from time to time.—*Pharm Jour.*, Feb., 1850.

Solubility of Iodine in Cod-Liver Oil. By FLEISCHMANN.—In order to discover in what proportion iodine is soluble in the fatty oils, Fleischmann rubbed down one and a half gr. of iodine with a few drops of *ol. jecoris aselli album*, and found that it soon dissolved. The oil at first assumed a dirty brown color; but upon the addition of five ounces more oil, this color disappeared, and no difference could be observed between the pure oil and this mixture.—*Pharm. Jour.*, from *Buchner's Repertorium*, 1849, No. 11.

White Enamel for cementing Earthenware and Glass.—Four parts of red lead, two parts of white sand, and three parts of crystallized boracic acid are to be finely powdered, washed, mixed, and fused in a Hessian crucible. The mass is then poured on a sheet of metal and finely triturated. The powder is applied with mucilage of tragacanth to the broken pieces, which are then joined and heated in the muffle, but only to such a temperature that the enamel binds them firmly together, without completely fusing.—*Pharm. Jour.*, from *Pharm. Central Blatt*, 1850, No. 13.

Editorial Department.

OUR JOURNAL.—This number concludes the twenty-second volume. It is intended, in commencing the next, to adopt some means by which an increase in the quantity of matter can be effected, without materially altering the appearance of the work. It would be gratifying to us if the Journal could be made more practically useful to the pharmacutists of this country, by their making it a medium of communication with each other on subjects appertaining to their profession. The name of the Journal should give it a general character, and there is every disposition on the part of the Editor and Publishing Committee to act with strict impartiality in reference to every sectional interest.

We have long been solicited to attach an advertising sheet to the Journal, but chiefly owing to the difficulty of drawing the line between the objectionable and the proper, it has been deferred from time to time. We now propose to append such a sheet, to each number, reserving to ourselves the full and entire right to decide on the admissibility of the advertisements, so as not to compromise the principle which has heretofore characterized the work, of opposition to empyricism. New pharmaceutical preparations, the composition of which is not secret; business notices; book notices, etc., will be inserted, but nothing that can properly be considered as quackery will be admitted.

It may be well to state in explanation, that we draw a distinction between a reservation of the skill and manipulations required in the preparation of a medicine, and a reservation of its composition. The most fastidious member of the College of Physicians may use Henry's magnesia without implicating his character as an opponent of quackery, because he knows what he prescribes as well as if he had witnessed its preparation, and any chemist can assure himself of its nature; but it is far different with a panacea, a vermifuge, or other complex mixture, which offers to effect wonderful results, and which appeals to the faith, and not to the judgment of the practitioner and consumer.

"Fatal effects from the carelessness of an Apothecary."—Under this heading we find the following article in the *Boston Medical and Surgical Journal* for August 7th, viz.:

As mentioned briefly in last week's Journal, an accident of a very serious nature recently occurred in this city. An apothecary, Mr. Wakefield,

mistaking the article in the physician's prescription, put up for chloride hydrargyri, the bi-chloride, and thereby, as it is reported, caused the death of Mr. James Hall, who took it. We cannot conceive how such an error could have occurred with any kind of carefulness on the part of the apothecary. Bottles may be misplaced, yet that would not afford an excuse; or even the bi-chloride may have been in the wrong bottle, which is still more reprehensible. The fact is, many of our apothecaries are not sufficiently educated, and not careful enough in compounding and dispensing medicines. Too much limit is allowed the apprentice in dealing with articles of such potency. It has often been advocated in the pages of this Journal, that the sale of such potent chemicals should be regulated by law; and further, that the apothecary should receive a medical education, and be duly qualified before entering upon his very responsible office. As the law now exists, any one can set himself up as an apothecary, even if he cannot tell buchu from senna leaves. In a future number we shall have something further to say on this subject.

In the case referred to, upon the verdict rendered by the jury of inquest, who investigated the circumstances attending the death of Mr. Hall, Mr. Coroner Smith entered a complaint in the Police Court against Mr. Wakefield, the apothecary, charging him with manslaughter. Mr. Wakefield was arrested, and brought before Justice Merrill, when, waiving an examination, he was required to furnish bail in \$5000 for his appearance at the ensuing term of the Municipal Court for trial on the charge made against him.

We have seen no account of this fatal mistake except the above, and do not know under what circumstances it occurred; whether the apothecary was solely to blame or not—whether the error arose from the ignorance of himself or his apprentice, or whether the physician, by the improper use of terms, may not in some measure have been instrumental in bringing about the casualty. We may safely say that there are none more strict in enforcing the obligations and responsibility of the apothecary to the medical profession and the public than ourselves: we hold that in every instance he should, before compounding a prescription, feel assured, as far as the circumstances of the case will admit, that what is written is the true expression of the physician's wishes, and does not embrace an error of inadvertence or of ignorance; for we do not have to go beyond this city to show that there are members of the medical profession grossly ignorant of the pharmaceutical and chemical relations of the drugs and medicines they prescribe. We admit, without hesitation, that even in this city, where the means of pharmaceutical education are greater and have existed longer than elsewhere in the Union, a number of unqualified persons are engaged in the apothecary's business, and will continue, until some legal restraint shall be enforced to compel the proper qualification,—yet we believe, in many instances where errors have occurred in compounding prescriptions, some blame should attach to the physician, either for imperfect chirography, or by the use of terms,

not officinal, often obsolete synonyms, which create doubt and cause trouble where a proper language would be easily understood. We will instance the present case. It appears that the prescription called for *chloride of mercury*, (hydrargyri chloridum,) and the apothecary put up *bichloride of mercury*, (hydrargyri bichloridum.) Now neither of these terms are the officinal designations of our own Pharmacopœia for calomel or corrosive sublimate, but they are those of the *London* code. By reference to Graham's and Kane's chemistries, both standard British chemical authorities, he will find *corrosive sublimate* described under the terms *chloride of mercury*, and calomel as *sub-chloride of mercury*. Without designing in the smallest degree to justify it, how easily might these chemical and pharmacopœial names be confounded through a careless inadvertence? It was in view of the constant and often necessary changes in chemical nomenclature, as that science progresses, that the framers of our Pharmacopœia adopted a language for these important preparations, which no probable change in chemical opinions would affect, viz., *mild* chloride of mercury for calomel, and *corrosive* chloride of mercury for corrosive sublimate. If physicians would conscientiously agree to employ the language of their national code, and carry it out in practice, we would hear of fewer errors of this kind. In Philadelphia, calomel is prescribed under the terms, "Hydrargyri chloridum mite," "Hydrargyri chloridum," "Hydrargyri proto-chloridum," "Hydrargyri sub-murias," "Hydrargyri murias mitis," "Hydrargyri murias dulcis," Calomelas," "Calomelas præparata," not to speak of the numerous modes of abbreviation and the scandalous handwriting in which the prescriptions are often couched.

The views of our Boston cotemporary in regard to the entrustment of prescriptions to unqualified apprentices and assistants; the necessity there exists for legal enactments respecting poisons; and the yet stronger necessity there is for more attention to the education of pharmacutists; agree perfectly with our own. In the United States, pharmacy is virtually unprotected in sight of the laws—is a mere trade or business—which any one may practice who has the money to commence and the assurance to prosecute it with the most meagre smattering of its language and materials. Whilst such is the case, how can it be expected that young men of ability will pass through a tedious course of practice, and study to qualify themselves as competitors to a host of pretenders, whilst a large portion of the public make no distinction between them save that which arises from a false economy? In fact there are few stores of the hundreds in this city, the revenues of which are sufficient to pay a qualified assistant as he deserves;

hence the custom of depending on apprentices. There is no real objection to this, if a proper system is followed, so that of two apprentices one will always be sufficiently advanced to act as a responsible assistant in the absence of his employer. The latter therefore is bound to exercise his best judgment in admitting youths to his establishment, to keep a conscientious watchfulness over their conduct whilst engaged in their duties, and to afford them every facility of advice, and books whereby they may acquire a rapid and correct knowledge of their profession. We have been pained repeatedly in our intercourse with the Pharmaceutical students of this city to learn how culpably negligent in some instances their employers have been in furnishing the means for study. It is the pecuniary interest of every pharmacist to render the inducement to study and intellectual culture strong; to his apprentices. Their increase of knowledge reacts in his favor, they are better satisfied with the necessary but onerous confinement they are subjected to, and they are less disposed to devote their leisure hours to the pernicious literature of the day or the sensual enjoyments too freely attainable in a large city, and which have lead many promising lads and young men from the path of rectitude, and plunged them into the vortex of dissipation, based on means dishonestly obtained from their employers. In so speaking we know that it is the truth. We have a strong sympathy with the young and rising members of the pharmaceutical body; we understand their difficulties and trials, imaginary and real; and we would encourage them to aim at a high standard of qualifications, and let no ordinary impediment, or short-lived temptation, prevent them from attaining to it. They will find the character thus gained a more substantial and valuable capital, when they arrive at manhood, than twice the amount necessary to stock a store. With such qualifications young men find no difficulty in getting situations, in which we frequently see them advanced till they become the principals.

APPARATUS FOR MAKING TINCTURES.—In Mohr and Redwood's Pharmacy, p. 567, a method of making tinctures is described, as suggested by Dr. Burton of London, which consists in suspending the ingredients, enclosed in a coarse bag, in the menstruum near its surface. The principle of circulatory displacement then comes into play viz., Solutions of solid bodies are generally heavier than the liquids by which they are made, and consequently when a soluble substance is suspended in a solvent, a downward current of solution and an upward current of menstruum is established, which continues until the whole liquid is equally saturated or until the substance is dissolved. The difficulty of procuring stoppered bottles with mouths sufficiently large to admit

of the introduction of the ingredients in the bag has been an objection to this method. Mr. Samuel Gale, in the April number of the *Pharmaceutical Journal*, proposes a cylindrical brown stone-ware vessel, with a movable diaphragm capable of being supported at different heights in the cylinder by projecting brackets, which corresponding notches in the edges of the diaphragm enables it to pass to the position required, when by turning a little its edges will rest on the brackets. The object of having several ranges of brackets is to be able to make different quantities of tincture in the same vessel. This method of making tinctures has many advantages over simple maceration; among the most prominent of which are, shorter time, the avoidance of agitation, absolutely necessary in the old plan, and the fact that the upper stratum of menstruum, in contact with the ingredients, is always the least saturated, and hence has more solvent power.

EXHIBITION OF INDUSTRY OF ALL NATIONS, TO BE HELD IN LONDON IN 1851.—There is perhaps no branch of human industry that will not be represented at the great Fair of 1851. Among these, chemical products used in medicine and the arts, both inorganic and organic, are included. We presume that among the contributions from the United States this class of productions will not be overlooked. Some of our Chemical manufacturers produce articles every way equal to the best similar articles of European origin, and they should feel a laudable ambition to stand well in this department on that occasion.

The following is a sketch of the four great sections of the articles to be exhibited; to give the sub-sections as contained in the Commissioners' announcement, would require ten of our pages.

SECTION I. Raw materials and produce—illustrative of the national productions on which human industry is employed.

SECTION II. Machinery for Agriculture, Manufacturing, Engineering, and other purposes, and Mechanical Inventions—illustrative of the agents which human ingenuity brings to bear upon the products of nature.

SECTION III. Manufactures—illustrative of the result produced by the operation of human industry upon natural produce.

SECTION IV. Sculpture, Models, and the Plastic Art generally—illustrative of the taste and skill displayed in such applications of human industry.

THE FIRST SECTION, under the heads of substances derived from the mineral, vegetable, and animal kingdoms, comprehends nearly all substances applicable to medicine and pharmacy.

The Commissioners will be ready to receive deposits from the 1st of January to 1st of March inclusive, after which date none will be re-

ceived. The foreign deposits (those from this country for instance) will not be charged with duty, and will be received through the custom-houses at London, Liverpool, Bristol, Hull, Newcastle, Dover, Folkestone and Southampton.

The exhibitors pay all expenses until the articles are deposited, but none after till the exhibition closes, when they may remove them from the country, or sell them, in which case the duties must be paid.

The Exhibition will open on the 1st of May and continue open for six months.

TILDEN'S EXTRACT OF CONIUM.—In our last number we gave the results of an examination of several of the extracts prepared in vacuo, by Tilden & Co., of New Lebanon, N. Y., with some suggestions calculated to improve their quality. Since then we have received from those gentlemen a bottle of Extract of Conium made in accordance with those suggestions.

The odor of this extract when opened is heavy and narcotic, reminding one of the bruised plant, though different; its color is dark brown without a trace of green, the chlorophyll having been removed; its consistence is nearly that proper for pills, adhesive and not pulpy like that before described. When triturated a short time with twice its weight of water, the whole is dissolved, except a small proportion of brown sediment. When mixed with an excess of potassa in solution, the odor of conia becomes strongly perceptible, with but little of the ammoniacal odor^s previously noticed in the green extract under the same treatment. When a strong solution of the extract, mixed with potassa, was distilled, the distillate consisted of a saturated solution of conia and some volatile oil, with numerous globules of the alkaloid floating on its surface. By a comparison with a similar experiment made two years ago with English extract of conium, the apparent yield was greater in this instance, which is probably due to the absence of the albumen and coloring matter in Tilden's, which increases its strength, admitting that the plants in each case possessed equal medicinal force.

In a pharmaceutical point of view, Messrs. Tilden & Co. have accomplished the object of their wishes, viz., a perfect vegetable extract in which the active principle of the plant is found in a concentrated form, unimpaired by the manipulation to which it has been subjected.

In reference to the therapeutic value of this extract, the brief time it has been in our possession does not justify any decided opinion. It is now in the hands of an experienced practitioner accustomed to observe closely the effects of medicines, and so far the results of the trials made are quite favorable to the quality of the extract. Our

chief interest in the success of the Messrs. Tilden's experiment, is not that it may prove a successful speculation, however favorable we may be to them in this regard; but it is that the question of the alleged deteriorating influence of our climate and soil on European narcotics, when grown here, may be fairly tested, and if not true, that our physicians may have the advantages arising from their home culture.

CALCINED MAGNESIA.—Several attempts have been made in this city to produce a magnesia similar in qualities to that of the Henrys, of Manchester, Eng. Our attention has been called to the subject by the reception of a bottle of "Husband's" magnesia and one of "Ellis's" magnesia, from their manufacturers, Thomas J. Husband and Charles Ellis & Co. The former is known to the public, the latter is just being introduced. They are put up in bottles in shape like Henry's, with the maker's names on them.

We are sensible that it is no easy task to give a fair and correct judgment in such a case; our opinion will be drawn from a comparison of the following data: Density, suspensibility in water, readiness of solubility in dilute acids, absence of carbonic acid, absence of iron, loss of weight by heat, smoothness in a dry state, and smoothness when mixed with water.

The real density of the three specimens, as ascertained by weighing 100 grs. of each in a 1000 gr. bottle filled with ether, sp. grav. .740, was 3.333, but their apparent density was quite different, owing to the varying molecular condition of the magnesia. When equal weights are put into dry test tubes and shaken down equally, Henry's occupies the least space, Husband's rather more, and Ellis's considerably more. When an equal weight of each is mixed with fifteen times its weight of water in a test tube, and well shaken, Henry's settles the soonest, Husband's next and Ellis's last, and after standing half an hour, the relative space occupied by the three was Henry's 2, Husband's 3 and Ellis's 5. Ellis's being the least dense, is more readily suspended in water, and makes a more lasting mixture than either of the others.

When an equal quantity of muriatic acid is added to each test tube containing magnesia and distilled water, and shaken at the same moment, Ellis's dissolves the quickest, Husband's almost as soon, whilst Henry's requires twice the time of Ellis's. When a few particles of each magnesia is pressed on different parts of a piece of moist reddened litmus paper, quite neutral, and left for a *minute*, the blue color is fully restored by Ellis's and Husband's, whilst Henry's hardly changes the shade. When taken into the mouth there is a perceptible difference between the specimens. Henry's at once diffuses itself in the saliva without any other than the mechanical impression of the

powder, for some minutes, when the peculiar taste of magnesia is slowly perceived. Husband's gives the magnesian taste sooner than Henry's and more decidedly, but is quite smooth on the tongue. Ellis's gives the taste yet more distinctly, and is also smooth on the tongue. The greater taste in the two latter is due to their quicker solubility in the saliva. When 100 grains of each specimen was kept at a red heat for half an hour in a platina crucible, Husband's lost 7.5 grains, whilst Henry's and Ellis's lost but .7 of a grain. As neither gave evidence of containing carbonic acid when dissolved in muriatic acid, the loss is attributable to water, accidentally present in the two last, but designed in Husband's, which is therefore a sub-hydrate of magnesia. A few drops of solution of ferrocyanuret of potassium was added to each of the muriatic solutions of the magnesia; a perceptible blueness was evidenced by Henry's and Ellis's, but only a tinge of green by Husband's. After standing 24 hours they each deposited Prussian blue, Husband's but a trace, Henry's more, Ellis's most. The water and acid used were proved to be free from iron by a parallel experiment. When each magnesia is placed on a sheet of paper, and a smooth spatula drawn over it with pressure, Henry's is the smoothest and least inclined to adhere to the paper or knife, Husband's more adherent, and Ellis's decidedly more so. The particles of the first two have less inclination to cohere than Ellis's, and are in this respect more like precipitated chalk.

They all mix readily with water by mere agitation, but from the nature of the particles, Henry's mixes most readily, but separates the soonest, and Ellis's, as has been stated, remains longest in suspension.

In conclusion, it may be stated, that whilst Henry's magnesia is taken with less inconvenience from taste, Husband's and Ellis's, by reason of their more ready solubility, act more quickly, and probably more efficiently, weight for weight, and are better calculated for mixtures where suspensibility is an advantage.

PHARMACEUTICAL MUSEUM.—For some time past a committee of the Philadelphia College of Pharmacy have been engaged in carrying out a resolution of that body, appropriating certain funds to the commencement of a Museum, of Chemical, Botanical, Pharmaceutical and Materia Medica specimens. They have had cases made, furnished with glass-ware of sizes to suit the purposes of such a cabinet, and a large number of them have been filled with well selected specimens. As there are many of the Graduates of the Institution located in various parts of the United States, in positions where they can obtain objects of pharmaceutical interest, we hope they will remember their Alma Mater when they meet with specimens calculated to enrich its collection.

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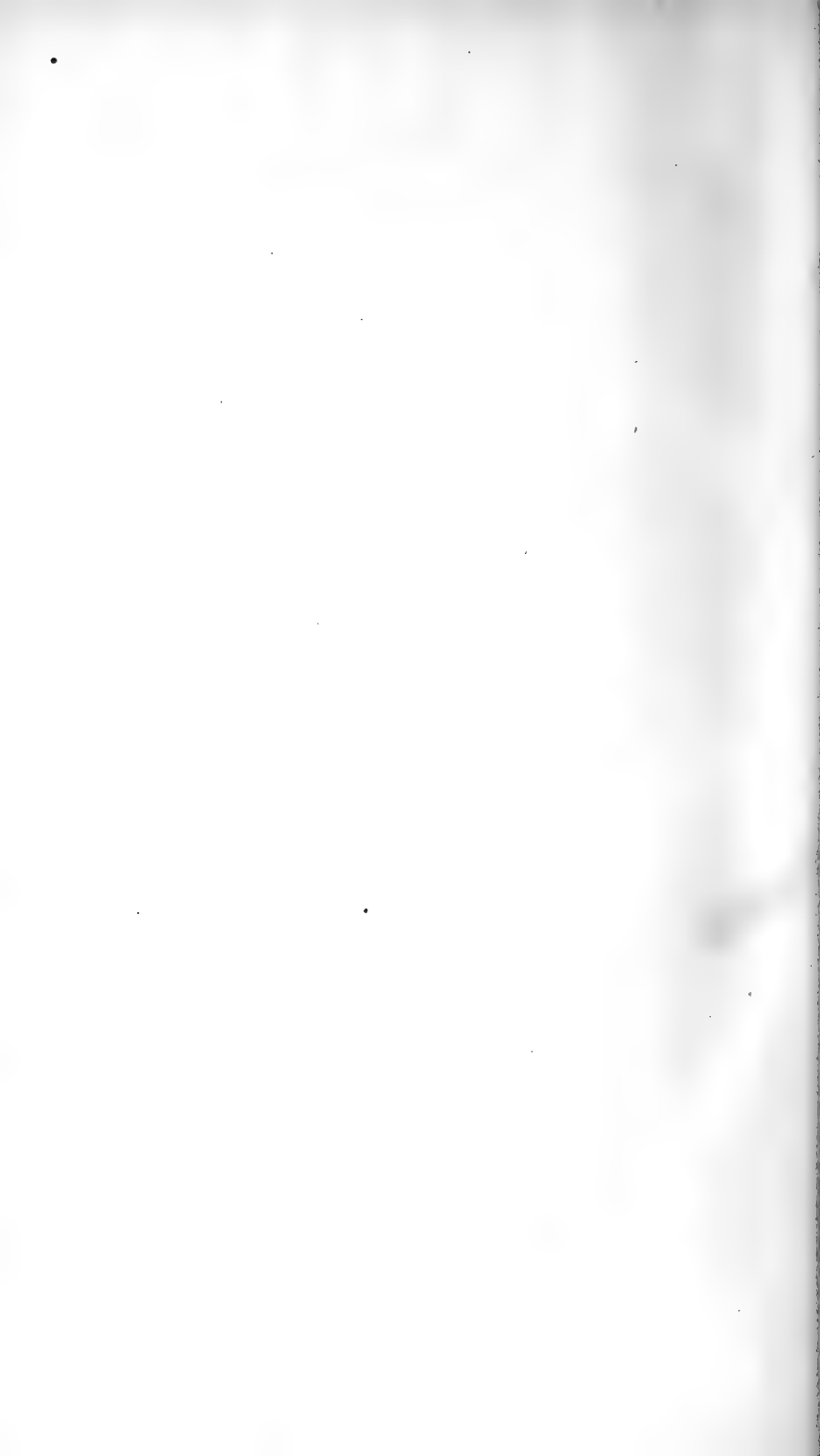
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